

500 FLOOD DAMAGE REDUCTION ACTIVITIES

This series of activities addresses flood damage to existing buildings. It complements the previous series that dealt with preventing damage to new development. Recognized damage reduction measures include acquiring, relocating, or retrofitting existing buildings and maintaining drainageways and retention basins.

Credit points for Activities 520 and 530 are adjusted according to the number of buildings affected. See Sections 301 through 303 for a discussion of impact adjustment ratios based on building counts.

Sections 501 through 503 and Activity 510 (Floodplain Management Planning) are mandatory for all or some repetitive loss communities. See Sections 501 and 502 for a discussion of the applicability of these requirements.

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501 The Repetitive Loss List

The Department of Homeland Security's Federal Emergency Management Agency (FEMA) produces a list of repetitive loss properties within each National Flood Insurance Program (NFIP) community that has one or more repetitive loss properties. This list must be obtained through the FEMA Regional Office by any community considering applying for the Community Rating System (CRS).

As part of its application and cycle verification, the community must review the list for accuracy, correct addresses, whether the properties are actually in the community's corporate limits, and whether the insured buildings have been removed, retrofitted, or otherwise protected from the cause of the repetitive flooding. The result of this review is recorded on a Repetitive Loss Update Worksheet (AW-501).

A community with repetitive losses must sign the activity worksheet, AW-502, certifying that each address has been checked. If there are updates, the submittal must include corrected Repetitive Loss Update Worksheets (AW 501) with any required supporting documentation. If no updates are necessary, only the AW-502 certification is submitted.

The Repetitive Loss Update Transmittal Sheet or a cover letter authorizing the updates must accompany all AW-501 submittals.

Failure to submit this material will result in the application's being returned. If the community does not conduct the review of the list at cycle verification, it will lose its CRS credit for addressing its repetitive loss properties, which can result in a reversion to a Class 10.

Repetitive loss properties are those properties for which two or more claims of more than \$1,000 have been paid by the NFIP within any 10-year period since 1978 (e.g., two claims during the periods 1978–1987, 1979–1988, etc.). These properties represent only 1% of all the NFIP's insurance policies, but they have accounted for nearly one-third of the claim payments (Figure 500-1). These properties cost the NFIP an estimated \$200 million per year in flood insurance claim payments (over \$4.5 billion to date). NFIP actuaries have reported that repetitive loss is the single most important factor that affects the stability of the National Flood Insurance Fund.

Each year, FEMA produces a list of repetitive loss properties for communities in or interested in the CRS. The list includes the property address, the dates of the claims, and, usually, the current insured's and/or previous owner's name. It is printed on a worksheet, AW-501, which can be ordered through the ISO/CRS Specialist or the FEMA Regional Office (see Appendix A and Appendix G) for any NFIP community. Before applying for the CRS, a community must check to see if it is classified as a repetitive loss community and if so, obtain its current repetitive loss list.

Repetitive Flood Loss Properties

In the United States there are over 115,000 **repetitive loss properties**, i.e., properties that have had two or more claims of more than \$1,000 paid by the NFIP within any 10-year period since 1978. Although some of these properties have had mitigation measures applied to them, most remain at risk of flooding.

To focus resources on those properties that represent the best opportunities for mitigation, Congress defined a subset called “Severe Repetitive Loss Properties” when it passed the Flood Insurance Reform Act of 2004. Severe Repetitive Loss Properties are those 1–4 family properties that have had four or more claims of more than \$5,000 or two to three claims that cumulatively exceed the building’s value. FEMA is directed by the Act to define Severe Repetitive Loss Property for multi-family buildings. For the purposes of the CRS, Severe Repetitive Loss Property also includes non-residential buildings that meet the same criteria as for 1–4 family properties. The flood insurance policies on these properties are serviced by a separate Special Direct Facility and not by individual Write Your Own insurance companies.

The Flood Insurance Reform Act creates new funding mechanisms to help mitigate flood damage to these properties and to other repetitive loss properties. A list of both categories of properties can be obtained from the FEMA Regional Office. The CRS participation criteria in Sections 501–503 require communities to address ALL their repetitive loss properties, not just those that meet the Severe Repetitive Loss Property definition. However, since these severe loss properties have had a disproportionate impact on the National Flood Insurance Fund, the CRS offers “bonus” points under selected activities, such as 520, Acquisition and Relocation, and 430, Flood Protection, for mitigating these properties.

Figure 500-1. Types of repetitive loss properties.

The community needs to make sure it has a current list before it submits its application or modification to the CRS and before its cycle verification is completed. It is the community’s responsibility to review the list for accuracy and updating. The community must note the following situations in which the form should be updated:

- The property is not located in the community’s jurisdiction. The property may be outside the community’s corporate limits, it may be in another city, or it may have been annexed into another community. If it can be determined which community the property belongs in, it will be removed from the list.
- There was an error in the repetitive loss database, such as a duplicate listing or an incorrect address.
- The property has subsequently been protected from the types of events that caused the losses. Buildings that have been acquired, relocated, retrofitted, or otherwise protected from the types of frequent floods that caused the past damage are not counted in determining the community’s CRS requirements.
- The property is protected from damage by the base flood shown on the current Flood Insurance Rate Map (FIRM). For example, the community may demonstrate

that the building is elevated or floodproofed above the base flood elevation but was flooded by a higher level. If the property is outside the Special Flood Hazard Area (SFHA), the community may show that all of the repetitive losses were caused by events with recurrence intervals of over 100 years (e.g., two 200-year storms).

It is hoped that the community will be able to locate all listed properties and determine why they were flooded, but it may be impossible to confirm every one. Updated information is noted on the form, AW-501, for each property that the community could locate.

Activity worksheets AW-501 (Repetitive Loss Update) and AW-502 (Repetitive Loss Requirements) (or the equivalent page from the *CRS Application*) are submitted with the community's CRS application or modification. FEMA reviews the revisions submitted by the community. If a property is not in the community, it will not be removed from the list unless the community in which the property does belong can be definitely identified.

Each year, a compact disk that includes a new set of AW-501 update worksheets is sent to each participating CRS community for informational purposes. It reflects the community's previously submitted changes, new properties that have been added due to recent floods, and changes resulting from other communities' updates. Except during cycle verification and as specified in Section 502.b, a community is not required under the CRS to respond to each year's new list. However, the list can be a valuable planning tool and source of information about the location and extent of flooding within the community. Communities are encouraged to submit any known updates every year.

502 Repetitive Loss Category

- a. For CRS purposes, there are three categories of repetitive loss communities based on the number of properties on the UPDATED repetitive loss list (i.e., after the changes and updates have been reported and accepted by FEMA):
 1. Category A: A community that has no repetitive loss properties, or whose repetitive loss properties all have had mitigation measures applied to them.
 2. Category B: A community with at least one, but fewer than 10, repetitive loss properties that have not received mitigation.
 3. Category C: A community with 10 or more repetitive loss properties that have not received mitigation.

Every community with one or more unmitigated repetitive loss property on FEMA's original list must submit a Repetitive Loss Requirements activity worksheet, AW-502 (or the equivalent page from the *CRS Application*), to be eligible for a CRS Class 9 or better.

Additional requirements depend on the community's repetitive loss category, which is determined by the number of repetitive loss properties without mitigation measures AFTER the applicant has updated the repetitive loss property information and submitted it for approval. Properties that have been mitigated, that are shown to be in another community,

or that are not currently insured and documented as impossible to identify and locate in the community, are not counted when determining the repetitive loss category .

- A Category A community has no special requirements except to submit information needed to update the repetitive loss list if applicable.
- A Category B community must review and describe its repetitive loss problem, prepare a map of the repetitive loss area(s), prepare a list of the addresses of all improved properties in those areas, and undertake an annual outreach project to those addresses. This is explained in Section 503. A copy of the outreach project is submitted with each year's recertification.
- A Category C community must do the same things as a Category B community AND prepare a floodplain management plan or area analyses for its repetitive loss area(s). The plan and area analysis requirements are explained in Activity 510 (Floodplain Management Planning).

b. A community's repetitive loss category may change over time as a result of flood damage reduction measures implemented by the community, as a result of floods that add new insurance losses to the FEMA list, or as a result of data updates.

A CRS community has no immediate need to take action as a result of a change in its repetitive loss category except as follows:

1. When it applies for or modifies its application for Activity 510 (Floodplain Management Planning).
2. When it submits a modification that will result in an increase in its CRS classification.
3. When it is slated for a complete cycle verification of its program. Cycle verification visits are conducted five years after the original application year for Class 6–9 communities, and every three years for Class 1–5 communities.

The last two situations are explained in more detail in Sections 215 and 234. They require that a community submit activity worksheets and documentation for all of its activities, including Activity 510.

c. If a community becomes a Category B community during the year of its cycle verification (see Section 234), it must begin the required outreach project during the following year. If a community becomes a Category C community during the year of its cycle verification, it has until October 1 of the following year to prepare and adopt the required floodplain management plan or area analyses for its repetitive loss areas. (However, all updates to its repetitive loss list must be submitted with the rest of the cycle verification materials.)

503 Repetitive Loss Area Outreach Project

Because repetitive flooding accounts for approximately 33% of all flood insurance claims payments, an outreach project is required for any community in repetitive loss category B or C. These communities must identify and describe their repetitive loss problem areas and initiate an outreach project to those areas.

In addition to the outreach project, a community in Category C must adopt a floodplain management plan or prepare area analyses for its repetitive loss areas. The plan or analyses must be submitted with the community's *CRS Application* under Activity 510 (Floodplain Management Planning).

If a Category B or C community fails to supply a copy of each year's outreach project with its recertification, or if a Category C community fails to submit its annual floodplain management plan or area analysis evaluation report with its recertification, it will revert to a Class 10.

Over 4 million buildings are insured by the NFIP, but only around 1% of them account for 33% of the flood insurance claims paid since 1978. This is because these few properties have been flooded more than once, and some of them have been flooded numerous times. The outreach project is mandatory for repetitive loss communities because such a small number of properties has such a big impact on the NFIP. Communities with 10 or more such properties (i.e., Category C communities) must also prepare plans to address their repetitive loss problems.

Every community with at least one repetitive loss property must undertake the outreach project to be eligible for the CRS. Failure to include the items listed in this Section 503 with an application or modification will prevent a review of the community's submittal.

A Category B or C community may be able to demonstrate that it has no repetitive loss properties. If so, the updates must be noted on the worksheet, AW-501. If all of the properties can be removed from the list by updating (see Section 501), then the community will be treated as a Category A community. In that case, it does not need to implement the items in this section.

In its CRS application, a community with one or more properties on the updated FEMA list (i.e., a category B or C community) must submit AW-502 and:

- a. A description of the cause(s) of the repetitive flooding;
- b. A map of its repetitive loss areas. The repetitive loss areas must include the properties on the repetitive loss list obtained from FEMA and all adjacent properties with the same or similar flooding conditions;
- c. A list of the addresses of all properties in the repetitive loss area(s) with insurable buildings on them; and
- d. The number of buildings in the repetitive loss area(s), bRLA.

The community must plot all the properties on FEMA's repetitive loss list and define all repetitive loss areas. In some cases, such as those in which the address consists of a rural route or box number, a property will be unplottable. However, local officials can often identify a property by the name of the insured, especially if the last flood was recent. All that is needed is for the general area of the property to be located, e.g., the 400 block of a street.

The community then plots its repetitive loss AREAS. The repetitive loss areas will include buildings on FEMA's list and nearby buildings that were subject to the same flood hazard.

After the repetitive loss AREAS are identified, the community must prepare an address list of all improved parcels in those areas. An improved parcel is one with an insurable building on it. For CRS purposes, an "insurable building" is defined in Section 301. This list has two purposes: it will be used for the outreach project, and it will determine the number of buildings in the community's repetitive loss areas.

The number of buildings currently in the community's repetitive loss areas is represented by the variable bRLA. This variable is also used in the impact adjustment for repetitive loss area analyses in Section 512. It should not be confused with bRL (number of properties on the FEMA repetitive loss list) in Activity 520, Acquisition and Relocation.

***NOTE:** If a community maintains flood insurance data on its repetitive loss properties, it must be remembered that such information is subject to the Privacy Act. Information such as the names of people and addresses of properties that have received repetitive flood insurance claims and the amounts of such claims may not be released to the public. Such information should be marked "For internal use only. Protected by the Privacy Act of 1974." Generic information, such as total claim payments for an area or data not connected to a particular property, may be made public.*

Example 503-1. (See Figure 500-2.) Floodville received its repetitive loss list from FEMA. Twenty properties were listed and the City Planner was able to plot the location of each. Floodville is a Category C community. Figure 500-2 shows that the City has two repetitive loss areas.

Area #1: Twelve of the properties had been flooded by ice jam floods in the late 1980s and early 1990s. The City drew a repetitive loss area boundary around an area that has been flooded by Foster Creek ice jams almost every other year. Six of the listed properties were purchased, two under FEMA's Hazard Mitigation Grant Program in 1996. The City's Foster Creek Park was expanded to the east to include the newly vacated lots. However, there are still 25 buildings remaining in Area #1 that have been flooded repeatedly, including six that either did not have flood insurance or did not have claims large enough to put them on the FEMA repetitive loss list. The City has all their addresses.

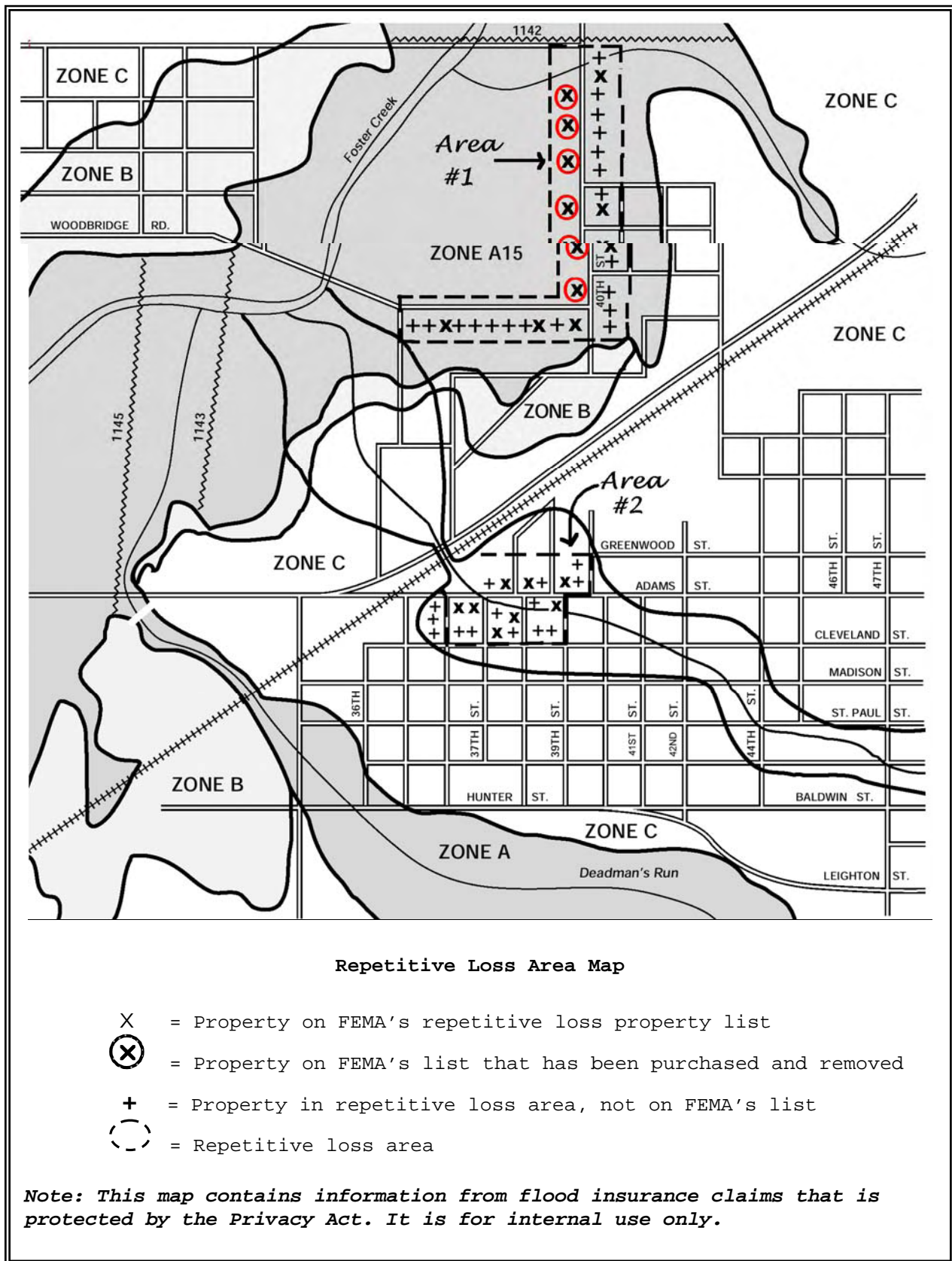


Figure 500-2. Floodville's repetitive loss area map.

Area #2: The other eight properties are in an area that has been flooded several times because of a railroad culvert that is too small. The culvert was properly sized when built 50 years ago, but new development upstream has increased runoff and recent storms have caused floods. The City had the area studied and is applying for credit for the study under Activity 410 (Additional Flood Data). A total of 22 buildings in Area #2 appear to be subject to the same level of flooding and the City has recorded their addresses.

bRL = the number of buildings on the FEMA repetitive loss list = 20. Note that this number includes those properties that were later removed or retrofitted.

bRLA = the number of buildings in the two repetitive loss areas = 25 + 22 = 47

e. A category B or C community must implement an annual outreach project to the properties in the mapped repetitive loss areas and include a copy of the project with its application.

1. The outreach project must advise the recipient of four things:

- (a) that the property is in or near an area subject to flooding;
- (b) property protection measures appropriate for the flood situation;
- (c) sources of financial assistance for property protection measures; and
- (d) basic facts about flood insurance.

2. The outreach project must be delivered to all properties in the repetitive loss AREAS, not just the properties on the FEMA list. This may be done in one of three ways:

- (a) An outreach project that is distributed each year and that reaches the properties in the repetitive loss areas. This project may also be submitted for credit as an outreach project to floodplain properties (OPF) or an additional outreach project (OPA) under Activity 330;
- (b) An outreach project pursuant to the public information strategy (OPS) credited in Activity 330, provided that the public information strategy identifies the target audience and discusses the best way to advise that audience about the hazard, property protection, available financial assistance, and flood insurance; or
- (c) An outreach project that does the same as (a) or (b), above, but is not credited under Activity 330. The materials must be distributed each year.

f. A category B or C community must include a copy of each year's outreach project with its annual recertification.

An example project appears in Figure 500-3. More information on outreach projects can be found in Activity 330 (Outreach Projects). In many cases, the community can combine this repetitive loss area outreach project with an outreach project credited under Activity 330. More information on sources of financial assistance can be found in Section 504.

*City of Floodville
City Hall
Floodville, ST 98765*

Resident
3801 Adams St.
Floodville, ST 98765

Dear Resident:

You have received this letter because your property is in an area that has been flooded several times. When our drainage system of ditches and culverts was built over 50 years ago, it could handle all but the largest storms. Since then, urban development in and upstream of Floodville has increased the amount of stormwater runoff. Now, heavy rains overload the system more often. As a result, your area floods on an average of every 3 – 4 years.

The City of Floodville is concerned about repetitive flooding and has an active program to help you protect yourself and your property from future flooding. We are seeking funding support to construct reservoirs upstream of your area and to make improvements that will increase the downstream floodwater carrying capacity.

Meanwhile, here are some things you can do:

1. Check with the Building Department (555-1234) on the extent of past flooding in your area. Department staff can tell you about the causes of repetitive flooding, what the City is doing about it, and what would be an appropriate flood protection level. City staff can visit your property to discuss flood protection alternatives.
2. Prepare for flooding by doing the following:
 - Know the flood safety guidance on the last page of this letter.
 - Know how to shut off the electricity and gas to your house when a flood comes.
 - Make a list of emergency numbers and identify a safe place to go to.
 - Make a household inventory, especially of basement contents.
 - Put insurance policies, valuable papers, medicine, etc. in a safe place.
 - Collect and put cleaning supplies, camera, waterproof boots, etc. in a handy place.
 - Develop a disaster response plan – See the Red Cross' website: www.redcross.org/services/disaster/ for a copy of the brochure "Your Family Disaster Plan"
 - Get a copy of *Repairing Your Flooded Home*. We have copies at the Public Works Department or it can be found on the Red Cross' website, too.

Figure 500-3a. Outreach project to Floodville's repetitive loss area #2.

Because Floodville's two repetitive loss areas have such different types of flooding, the City sends different mailings to each. This one includes property protection and financial assistance information appropriate for area #2's shallow flooding.

3. Consider some permanent flood protection measures.

- Mark your fuse or breaker box to show the circuits to the floodable areas. Turning off the power to the basement can reduce property damage and save lives.
- Consider elevating your house above flood levels. This was done on St. Mary's Road near 40th Street. In 1998, the Foster Creek flood went under these houses without damaging them.
- Check your building for water entry points. These can be basement windows, the basement stairwell, doors, and dryer vents. These can be protected with low walls or temporary shields.
- Install a floor drain plug, standpipe, overhead sewer, or sewer backup valve to prevent sewer backup flooding.
- More information can be found in *Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding*. Copies are in the Floodville Public Library or at www.fema.gov/hazards/floods/lib312.shtm
- Note that some flood protection measures may need a building permit and others may not be safe for your type of building, so be sure to talk to the Building Department.

5. Talk to the Building Department for information on financial assistance.

- The City administers a flood protection rebate program that will pay 25% of approved projects, up to a total of \$2,500. This program has funded low floodwalls, overhead sewers, sewer backup valves, and relocation of utilities to higher levels.
- If you are interested in elevating your building above the flood level or selling it to the City, we may apply for a Federal grant to cover 75% of the cost.
- Get a flood insurance policy – it will help pay for repairs after a flood and, in some cases, it will help pay the costs of elevating a substantially damaged building.

6. Get a flood insurance policy.

- Homeowner's insurance policies do not cover damage from floods. However, because Floodville participates in the National Flood Insurance Program, you can purchase a separate flood insurance policy. This insurance is backed by the Federal government and is available to everyone, even properties that have been flooded. Because Floodville participates in the Community Rating System, you will receive a reduction in the insurance premium.
- Because your area is not mapped as a Special Flood Hazard Area, you may qualify for a lower-cost Preferred Risk Policy.
- Some people have purchased flood insurance because it was required by the bank when they got a mortgage or home improvement loan. Usually these policies just cover the building's structure and not the contents. During the kind of flooding that happens in your area, there is usually more damage to the furniture and contents than there is to the structure. Be sure you have contents coverage.
- Don't wait for the next flood to buy insurance protection. In most cases, there is a 30-day waiting period before National Flood Insurance Program coverage takes effect.
- Contact your insurance agent for more information on rates and coverage.

Figure 500-3b. Page two of Floodville's outreach project to its repetitive loss area #2.

An annual outreach project to floodplain properties (OPF) in Activity 330 (Outreach Projects) can satisfy this requirement, provided that (1) it covers the flood insurance and property protection topics as described in Section 331; (2) it discusses sources of financial assistance; and (3) it reaches all properties in the repetitive loss areas, including those not in the SFHA. If it does not qualify for OPF, the outreach project to the repetitive loss areas may qualify for credit as an additional outreach project (OPA) under Activity 330.

This information is submitted on AW-502 or its equivalent page in the *CRS Application*.

504 Repetitive Loss Mitigation Activities

Sections 501–503 describe the minimum CRS participation requirements for repetitive loss communities. The requirements focus on updating repetitive loss records, identifying the extent of the problem, and providing basic information to owners of properties in the repetitive loss area(s).

The CRS encourages communities to do more to reduce their repetitive flooding problems. Special additional credit points are provided in the following activities for actions that address repetitive loss properties or repetitive loss areas:

- 410—Additional Flood Data: Bonus points are provided for mapping and regulating repetitive loss areas in B, C, and X Zones (Section 411.a).
- 510—Floodplain Management Planning: Credit is given for conducting an analysis of the repetitive loss areas and determining appropriate mitigation measures for these areas (Section 511.b).
- 520—Acquisition and Relocation: Bonus points are provided for acquiring or otherwise removing repetitive loss properties, with larger bonuses for Severe Repetitive Loss Properties (Section 521.b).
- 530—Flood Protection: Bonus points are provided for retrofitting or otherwise protecting repetitive loss properties, with larger bonuses for Severe Repetitive Loss Properties (Section 531.e).

FEMA has several financial assistance programs that can help communities implement some of these activities. There are four programs that can fund acquisition, retrofitting, and other flood protection projects that would qualify for credit under Activities 520 and 530. All four of them require that an applicant community have a hazard mitigation plan, as described in Activity 510 (Floodplain Management Planning).

- Flood Mitigation Assistance (FMA). FMA funds are specifically designed to be used to reduce losses to NFIP-insured buildings. Each year a certain amount is set aside for planning grants, project grants (e.g., acquisition or retrofitting), and technical assistance grants. FMA funds are allocated to the states each year.

- The Pilot Program under the Flood Insurance Reform Act of 2004. This program has been authorized additional funds under FMA to mitigation Severe Repetitive Loss properties (see Figure 500-1).
- Hazard Mitigation Grant Program (HMGP). HMGP funds are made available after a Presidential disaster declaration. The amount of funding available varies, based on the total amount of expected federal disaster assistance (the bigger the disaster, the more money will be available). Often, funds can used throughout the state, not just in the declared area.
- Pre-Disaster Mitigation Program (PDM). Annual appropriations provide the funding for the PDM program. There is no state allocation or formula to distribute the funds. Communities throughout the country can apply.

All four programs are managed by the state, usually by the emergency management agency. The state may set additional priorities for use of the funds.

There are other sources of financial assistance:

- Community Development Block Grants are provided to larger cities and counties; smaller communities can apply to the state community development agency.
- The U.S. Army Corps of Engineers will support elevation and flood control projects as part of a larger flood protection program.
- The U.S. Department of Agriculture's Natural Resources Conservation Service can help fund retrofitting and local flood control projects in smaller watersheds.
- Flood insurance claims can include Increased Cost of Compliance funding, which is described in Figure 430-5. This provision provides additional coverage to help underwrite a flood protection project that is required by code as a condition to rebuild the flooded building. It can also be used to help pay the non-federal portion of a cost-shared retrofitting project. The Flood Insurance Reform Act of 2004 provides for this coverage to be made available, in most cases, for insured structures for which offers of mitigation assistance have been made under certain federally funded mitigation programs.
- Many states and regional or county flood control districts have their own funding programs or will help on the non-federal cost share of a federal program.
- Many communities have developed financial assistance programs, especially for sewer backup and local drainage problems, where mitigation projects may be relatively inexpensive.

- More and more communities are starting rebate programs, similar to Floodville's (described in Figure 500-3b). These cost the local government relatively little, but act as an effective catalyst to motivate the owner to retrofit.

More information on financial assistance programs to protect individual buildings can be found in

Local Flood Proofing Programs, U.S. Army Corps of Engineers, 2005, available at <https://www.nwo.usace.army.mil/nfpc/publications.html>.

505 National Flood Insurance Reform Act of 1994

This Act requires that, "if a community has received mitigation assistance under Section 1366 [the Flood Mitigation Assistance Program], the credits shall be phased in a manner, determined by the Director, to recover the amount of such assistance provided for the community."

When the ISO/CRS Specialist visits a community that received funds from the Flood Mitigation Assistance Program, those funded projects that are related to CRS credit will be reviewed, and the scores pro-rated based on FEMA's share of the cost.

Generally, this will be limited to Activity 520 (Acquisition and Relocation) and 530 (Flood Protection), the two activities most likely to be funded.

NOTE: *This is a statutory requirement that only applies to the Flood Mitigation Assistance program, not to other FEMA-funded financial assistance programs.*

Example 505-1. A community applies for credit under Activity 520 (Acquisition and Relocation) for having removed 20 buildings from the floodplain. Five of those buildings were acquired with a 75% grant from the Flood Mitigation Assistance Program.

The ISO/CRS Specialist will calculate the score based on 25% credit for the five buildings and full credit for the other 15. If the community can demonstrate that there was a higher local cost-share, the points will be adjusted accordingly.

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510 FLOODPLAIN MANAGEMENT PLANNING

Summary of Section 510

Credit is provided for preparing, adopting, implementing, evaluating, and updating a comprehensive floodplain management plan or repetitive loss area analyses. The Community Rating System (CRS) does not specify what must be in a plan, but it only credits plans that have been prepared and kept updated according to the standard planning process explained in Section 511. Credit is also provided for implementing a habitat conservation plan.

511 Credit Points. Up to 359 points are provided for three elements.

- a. Up to 294 points are provided for adopting and implementing a floodplain management plan (FMP) that was developed using the following standard planning process. There must be some credit for each of the 10 planning steps.

<u>Step</u>	<u>Max points</u>
1. Organize to prepare the plan	10
2. Involve the public	85
3. Coordinate with other agencies	25
4. Assess the hazard	20
5. Assess the problem	35
6. Set goals	2
7. Review possible activities	30
8. Draft an action plan	70
9. Adopt the plan	2
10. Implement, evaluate, and revise	15

- b. Up to 50 points are provided for conducting repetitive loss area analyses (RLAA).
- c. Up to 15 points are provided for adopting and implementing a Habitat Conservation Plan (HCP).

512 Impact Adjustment.

- a. Under Option 1, if the floodplain management plan covers all of the community's known flood hazard areas, the impact adjustment ratio is 1.0. If the repetitive loss area analyses cover all repetitive loss areas, the impact adjustment ratio is 1.0. A Category C repetitive loss community must use Option 1 if it is preparing a plan or analysis to meet the CRS participation prerequisite specified in Section 502.
- b. Under Option 2, if the floodplain management plan or repetitive loss area analyses cover some of the community's hazard areas, the impact adjustment ratio is 0.25. A Category C repetitive loss community must use Option 1.
- c. Under Option 3, the impact adjustment ratios reflect the proportion of the community's repetitive loss areas that are covered by area analyses.

513 Credit Calculation. The credit points for each element are multiplied by the impact adjustment ratios and the products are totaled.

514 Credit Documentation. The community must submit the following.

- a. The activity worksheet or plan review crosswalk.
- b. A copy of the floodplain management plan with the credited elements noted in the margin or explained in an attached memo.
- c. Documentation showing how the public was involved in preparing or reviewing the plan.
- d. Copies of materials that document coordination with other municipalities, agencies, and organizations credited under Section 511.a.3(b)-(f).
- e. Documentation showing that the plan has been adopted by the community's governing body and/or the habitat conservation plan was accepted by the appropriate agency.
- f. A copy of each repetitive loss area analysis.

The community must submit the following with its annual CRS recertification.

- g. An annual evaluation report on progress toward implementing the recommendations.
- h. An update to the plan, prepared at least every five years.

515 For More Information. A free CRS publication, *Example Plans*, provides more information and examples for this activity.

510 FLOODPLAIN MANAGEMENT PLANNING

Background: Programs that are based on a comprehensive floodplain management or hazard mitigation plan address all the community's flood problems more effectively.

NOTE: A separate publication, *Example Plans*, has a detailed discussion of the requirements of this section and of multi-hazard mitigation plans, as well as model plans and application documentation. Communities are encouraged to obtain and read this document before applying for this activity. It will improve the quality of the submittal and reduce the need to provide additional documentation later. To order a free copy, see Appendix E.

The objective of floodplain management or hazard mitigation planning is to produce a program of activities that will best tackle the community's vulnerability to the hazard(s) and meet other community needs. A well-prepared plan will:

- Ensure that a comprehensive review of possible activities and mitigation measures is conducted so that the most appropriate solutions are used to address the hazard.
- Ensure that the recommended activities meet the goals and objectives of the community, do not create conflicts with other activities, and are coordinated to reduce the costs of implementing individual activities.
- Educate residents about the hazards, loss reduction measures, and the natural and beneficial functions of floodplains.
- Build public and political support for projects that prevent new problems, reduce losses, and protect the natural and beneficial functions of floodplains.
- Build a constituency that wants to see the plan's recommendations implemented.

Activity Description: Credit is provided for preparing, adopting, implementing, evaluating, and updating a comprehensive floodplain management plan. The Department of Homeland Security's Federal Emergency Management Agency (FEMA) also requires a multi-hazard mitigation plan as a prerequisite for mitigation funding. The CRS and FEMA do not specify what activities a plan must recommend, but they only recognize plans that have been prepared according to the standard planning process explained in FEMA regulations and Section 511 of this activity.

An area analysis focuses on reducing damage to repetitively flooded buildings. It has a narrower scope than a plan, and receives fewer credit points. A Category C repetitive loss community must prepare either a floodplain management plan or area analyses that cover at least all of its repetitive loss areas. A community can receive credit for both efforts, but they must be published as separate documents.

Floodplain management planning that covers all of a community's known flood hazards is encouraged. However, if the planning is for less than all flood problems (e.g., just some of the repetitive loss areas), the credit points are reduced by using the impact adjustment (see Sections 512 and 513).

To maintain the credit for this activity, the community must annually evaluate progress toward implementing the plan or area analysis and submit an evaluation report with its annual CRS recertification. It must prepare an update to its plan at least every five years.

Because each community is different, each planning effort will be different. The objective of this credit is to ensure that a process was followed that selected the best measures for the community and its hazards. Therefore, the key elements for crediting a floodplain management or hazard mitigation plan or area analysis focus on the process used to prepare it. A plan by another name, such as a post-flood or multi-hazard mitigation plan, could receive this credit if it was prepared in accordance with the process explained in Section 511 or FEMA's multi-hazard mitigation planning guidance.

The floodplain management plan must have been developed using a standard, step-by-step, planning process. To receive credit for a floodplain management plan, the community's process must include at least one item from each of the 10 steps explained Section 511.a.

FEMA's multi-hazard mitigation planning regulations pursuant to the Disaster Mitigation Act of 2000 are specified in 44 *CFR* 201.6. The 10-step CRS process is consistent with those regulations, which identify four essential parts to mitigation planning. The 10 steps are organized in the table below with the four phases of the mitigation planning requirements.

Multi-Hazard Mitigation Planning Regulations (44 <i>CFR</i> 201.6)	CRS Planning Steps	Maximum Points
Phase I – Planning process		
201.6(c)(1)	1. Organize	10
201.6(b)(1)	2. Involve the public	85
201.6(b)(2) & (3)	3. Coordinate	25
Phase II – Risk assessment		
201.6(c)(2)(i)	4. Assess the hazard	20
201.6(c)(2)(ii) & (iii)	5. Assess the problem	35
Phase III – Mitigation strategy		
201.6(c)(3)(i)	6. Set goals	2
201.6(c)(3)(ii)	7. Review possible activities	30
201.6(c)(3)(iii)	8. Draft an action plan	70
Phase IV – Plan maintenance		
201.6(c)(5)	9. Adopt the plan	2
201.6(c)(4)	10. Implement, evaluate, revise	15
	Total	294

Although the planning process must follow the 10-step process, the plan document does not need to be organized according to these 10 steps. However, the community must submit the plan with its submittal for credit and identify where these steps were covered. Steps 1, 4, 5, 6, 7, 8, and 10 must appear in the plan document. The other three steps can be in the plan document or they may be explained in a separate memo from the community or the plan's author. The location of each step that is covered in the plan document must be clearly marked.

A plan developed for the CRS can fulfill the mitigation planning prerequisite for a project grant from FEMA's Flood Mitigation Assistance (FMA), Pre-Disaster Mitigation (PDM), and Hazard Mitigation Grant Programs (HMGP). These programs also provide funds to communities to help prepare such plans if they address the full range of natural hazards affecting the community.

NOTE: *It is recommended that the local planner review all of these planning programs' guidelines to ensure that the planning effort will meet all of their criteria. With proper planning, one plan document can fulfill several programs' requirements.*

Additional items needed to meet FEMA's requirements for these other programs are noted in this activity. There may be other conditions set by the state office that approves plans for the grants. It is recommended that planners check with the appropriate state office(s) before beginning the planning work. These programs are administered by the state hazard mitigation office, usually located in the state emergency management agency.

The U.S. Army Corps of Engineers also has a floodplain management planning requirement. Communities receiving funding from the Corps for flood protection projects are required to prepare a floodplain management plan following procedures similar to this activity's 10-step process. The Corps guidance specifically states that CRS plans may be sufficient for that requirement (Policy Guidance Letter No. 52). For more information, contact the District Office of the Corps of Engineers.

Other federal programs also encourage comprehensive floodplain management planning, including the Fish and Wildlife Service's Habitat Conservation Plans, the Natural Resources Conservation Service's watershed planning, and the Environmental Protection Agency's multi-objective management planning. A community's flood protection planning efforts should include contacting these programs and coordinating with them as much as possible.

One other note about planning: planning is a comprehensive "future-oriented" approach that determines how a community will deal with its flooding problem(s) and protect the natural and beneficial functions of its floodplain. Planning guides the community through its problem(s) by reviewing options for solving the problem(s) and identifying the most appropriate solutions.

An ordinance is not a plan. An ordinance sets standards for land development and other activities. Planning may include a review of land development standards and procedures, but it should also cover a much broader range of activities as noted in Figure 510-2.

511 Credit Points

Maximum credit for floodplain management planning: 359 points

a. Floodplain management planning (FMP) (Maximum credit: 294 points)

The floodplain management plan must have been developed using the standard 10-step planning process. TO RECEIVE CREDIT UNDER THIS ACTIVITY, THE PLANNING PROCESS MUST RECEIVE SOME CREDIT UNDER EACH OF THE 10 STEPS LISTED BELOW.

Floodplain management planning (FMP) = the total of the following points credited for each of the 10 steps.

Phase I – Planning Process

1. Organize to prepare the plan (Maximum credit: 10 points). The credit for this step is the total of the following points, which are based on how the community organizes to prepare its floodplain management plan:

- (a) 2, if the planning process is under the supervision or direction of a professional planner;
- (b) 6, if the planning process is conducted through a committee composed of staff from those community departments that will be implementing the majority of the plan's recommendations;
- (c) 2, if the planning process and/or the committee are formally created or recognized by action of the community's governing board.

The plan document must discuss how it was prepared, who was involved in the planning process, and how the public was involved during the planning process. (REQUIRED)

When a multi-jurisdictional plan is prepared, at least one representative from each community seeking CRS credit must be involved on the planning committee that is credited under item (b).

To receive credit, the planning process must be consistent with these 10 steps and receive credit points for each or them. For some steps, such as step 1, the community may show that it implemented at least one of the listed credit items. For other steps, specific items are required at a minimum. Required items are noted with “(REQUIRED)” after them.

NOTE: if the plan preparation process includes all “REQUIRED” items, the plan will qualify under both CRS and FEMA’s multi-hazard mitigation plan criteria. However, if the planning includes ONLY those items, it will not receive very many points under this activity.

The plan must document how the community organized to prepare the plan. If the planning committee includes representatives from the public and other stakeholders, additional credit is provided in the next step.

Item (a): A “professional planner” may be a community employee, consultant, or an advisor from a state agency or regional planning agency. He or she does not have to be a member of the American Institute of Certified Planners (AICP). Someone with an urban planning degree or someone with land use planning, community planning, or urban renewal experience may be a professional planner. However, the CRS will not recognize a building official, emergency manager, engineer, or other non-planner acting alone as a professional planner, unless they have the type of planning experience noted above.

Item (b): A planning committee is strongly recommended. By involving those who will be most affected by the planning, the community will get a more realistic product that will have a much better chance of being adopted and implemented. Community departments that should be represented on the committee include:

- Building department/code enforcement
- Land use planning/zoning
- Emergency management/public safety
- Environmental protection/public health
- Engineering
- Public works
- Public information
- Parks/recreation

Item (c): Two points are provided if the community’s governing board (e.g., the city council) formally recognizes the planning process. However, a preferred method is a formal resolution that designates who is responsible for preparing the plan and specifies a completion deadline. If a committee with representatives from the public is used, the resolution should identify the members, who acts as chair, and how staff support is provided.

Phase I – Planning Process

2. Involve the public (Maximum credit: 85 points). The planning process must include an opportunity for the public to comment on the plan during the drafting stage and before plan approval (REQUIRED). The term “public” includes residents, businesses, property owners, and tenants in the floodplain and other known hazard areas as well as other stakeholders in the community, such as business leaders, civic groups, academia, non-profit organizations, and major employers. The credit for this step is the total of the following points based on how the community involves the public during the planning process.

(a) 40, if the planning process is conducted through a planning committee that includes members of the public. If this is the same planning committee credited under step 1, items (b) and (c), at least one half of the members must be representatives of the public, including residents, businesses, or property owners from the floodprone areas. The committee must hold a sufficient number of meetings that involve the members in planning steps 4 through 9 (e.g., at least one meeting on each step).

- (b) 15, if one or more public information meetings are held in the affected area(s) at the beginning of the planning process to obtain public input on the natural hazards, problems, and possible solutions. At least one meeting must be held separate from the planning committee meetings in item (a).
- (c) 15, for holding at least one public meeting to obtain input on the draft plan. The meeting must be at the end of the planning process, at least two weeks before submittal of the recommended plan to the community's governing body.
- (d) 5, if questionnaires are distributed asking the public for information on their natural hazards, problems, and possible solutions. The questionnaires must be distributed to at least 90% of the floodplain residents.
- (e) 5, if written comments and recommendations are solicited from neighborhood advisory groups, homeowners' associations, parent-teacher organizations, the Chamber of Commerce, or similar organizations that represent the public in the affected area(s).
- (f) 5, if other public information activities are implemented to explain the planning process and encourage input to the planner or planning committee.

The term "public" includes floodplain residents, the owners or managers of floodprone properties, business leaders, civic groups, academia, non-profit organizations, major employers, managers of critical facilities, farmers, landowners, developers, and others from outside governmental agencies. The involvement of the public and community stakeholders is encouraged because their activities can impact natural hazards and they can participate in or support the recommendations of the plan.

Item (a): The credit points show the importance of involving the public in the planning process, especially as members of the planning committee. The highest number of points for this activity are provided for having a planning committee responsible for floodplain management planning. At least half of its members must be from the public. The rest should be staff from the local government and agencies that will likely be responsible for implementing the plan.

The large number of points provided is because a citizens' planning committee has the following advantages:

- The participants recognize that they are involved and will be more willing to commit themselves to the process.
- The participants can do some of the work, especially data gathering, thereby reducing the overall cost.

- A committee can be an effective forum for discussing alternatives, debating goals and objectives, and matching the technical requirements of a program to local situations.
- It gives the participants a feeling of “ownership” of the plan and its recommendations, which helps build public support for it.
- Committee members form a constituency that will have a stake in ensuring that the plan is implemented.

No credit is provided if the committee only meets once or twice. It must meet a sufficient number of times to involve the members in the following key steps of the planning process (e.g., at least one meeting on each step):

4. Assess the hazard
5. Assess the problem
6. Set goals
7. Review possible activities
8. Draft an action plan.

Items (b) and (c): If the community invites the public to comment during the planning process or holds the meetings credited under items (b) or (c), it must attempt to notify floodplain residents of the meetings and explain the planning process in the notification. The notices of the meetings should be in the form of letters to floodplain residents, a notice sent to all residents, or a newspaper article or advertisement. An inconspicuous legal notice appearing in the classified section of the newspaper is not sufficient for CRS credit. If very few residents are affected, as may be the case for a plan that addresses only a repetitive loss area, a written record that the residents were called would be sufficient documentation.

The intent of the public meeting(s) under item (b) is to go out to the people to gather input. It is recommended that some of these meetings be held in the affected neighborhoods. At a minimum, they must be separate from regular meetings of the planning committee or the community’s governing body.

For credit for item (c), simply discussing the plan at a regular public meeting of the governing body, just before it is voted on, is not sufficient public input for CRS credit. To receive credit for this item, there must be at least one public meeting at the end of the planning process where the proposals are explained and people can ask questions and submit their comments. State and local laws take precedence, however. The CRS does not require public hearings. The community’s legal counsel should determine if a public hearing is required.

Item (d): A questionnaire is credited if it is distributed to at least 90% of the floodplain residents. For example, it could be included as a page in a newsletter or other outreach project, such as those credited under Activity 330 (Outreach Projects). If the plan covers only the repetitive loss areas, the questionnaire must go to at least 90% of the residents of those areas.

Item (f): This credit is provided for public information activities IN ADDITION to any that are credited under other items. For example, if the only public involvement activity was the final public meeting, the community would receive 15 points under item (c) and would have no credit under item (f). If the only activity was to place information on the community's website and ask for comments, it would be credited under item (f), because no other items credit a website.

Phase I – Planning Process

3. Coordinate (Maximum credit: 25 points). Other agencies and organizations must be contacted to see if they are doing anything that may affect the community's program and to see if they could support the community's efforts.

Examples of "other agencies and organizations" include neighboring communities; local, regional, state, and federal agencies; and businesses, academia, and other private and non-profit organizations affected by the hazards or involved in hazard mitigation or floodplain management.

The credit for this step is the total of the following points. To receive credit for this step, the coordination must include items (a) and (b).

- (a) 3, if the planning includes a review of existing studies, reports, and technical information and of the community's needs, goals, and plans for the area. (REQUIRED)
- (b) 1, if neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-profit interests are given an opportunity to be involved in the planning process. (REQUIRED)
- (c) 4, if neighboring communities, the state NFIP Coordinator, the state water resources agency, the county and state emergency management agency, the FEMA Regional Office, and (where appropriate) the state's coastal zone management agency are contacted at the beginning of the planning process to see if they are doing anything that may affect the community's program and to see how they can support the community's efforts.
- (d) 4, if other governmental and nongovernmental organizations, such as the National Weather Service, Red Cross, homebuilders association, and environmental groups are contacted at the beginning of the planning process to see if they are doing anything that may affect the community's program and to see how they can support the community's efforts.
- (e) 10, if the coordination effort includes holding meetings with representatives of the other agencies and organizations to review common problems, development policies, mitigation strategies, inconsistencies, and conflicts in policies, plans, programs, and regulations.

- (f) 3, for sending the draft action plan to the other agencies and organizations contacted under items (b), (c), (d), and (e) and asking them to comment by a certain date.

This step mirrors step 2, which encourages the planner and the planning committee to communicate and coordinate with the public and stakeholders. To receive credit for this step, items (a) and (b) must be implemented.

Item (a): The community's needs and goals should already be identified as part of previous comprehensive planning activities. If not, they should be identified to ensure that the plan's recommendations will be coordinated with other community activities. Community development and floodplain management goals may be mutually supportive or they may conflict.

For example, if the community wants more recreational opportunities, clearing out the floodplain to provide a scenic waterfront park may be most appropriate. Conversely, if the floodplain includes the downtown and local officials are solidly behind economic development, the plan should probably recommend measures other than removing the community's economic base.

Items (b) through (f): Examples of local and regional agencies that should be contacted include adjacent communities; regional flood, stormwater management, or sanitary districts; levee districts; county flood control authorities; the soil and water conservation district; park districts; and other agencies involved in hazard mitigation or regulation of new development. The State National Flood Insurance Program (NFIP) Coordinator and the state and FEMA regional mitigation officers should be able to identify state and federal agencies that may be conducting activities, such as construction projects and regulatory programs, that could affect (or should be coordinated with) the community's planning.

Item (e): The meetings need only be held with those agencies that have the most impact on the community's problem. Some agencies may be so important that their representatives may be invited to sit on the planning committee.

Phase II – Risk Assessment

4. Assess the hazard (Maximum credit: 20 points). The credit for this step is the total of the following points based on what the community includes in its assessment of the hazard. To receive CRS credit for this step, the assessment must include item (a). If the community wants the plan to also qualify as a FEMA multi-hazard mitigation plan, item (b) must also be completed.

- (a) 15, for including an assessment of the flood hazard in the plan. If the community is a Category B or C repetitive loss community, this step must cover all of its repetitive loss areas (REQUIRED). The assessment must include at least one of the following items:

- (1) a map of the known flood hazards. "Known flood hazards" means the floodplain shown on the Flood Insurance Rate Map (FIRM), repetitive loss areas, areas not mapped on the FIRM that have flooded in the past, and surface flooding identified in existing studies. No new studies need to be conducted for this assessment. (5 points)
 - (2) a description of the known flood hazards, including source of water, depth of flooding, velocities, and warning time. (5 points)
 - (3) a discussion of past floods. (5 points)
- (b) 5, if the plan includes a map, description of the magnitude or severity, history, and probability of future events for other natural hazards, such as erosion, tsunamis, earthquakes, and hurricanes. The plan should include all natural hazards that affect the community. At a minimum, it should include those hazards identified by the state's hazard mitigation plan. (REQUIRED FOR PLANS TO BE CREDITED UNDER THE DISASTER MITIGATION ACT OF 2000)

Item (a): This step involves gathering and reviewing existing flood studies, including the Flood Insurance Study, drainage problem studies, and SLOSH and SPLASH models that identify areas inundated during hurricanes. For CRS credit, the community does not need to conduct studies to develop new flood data.

The hazard assessment needs to describe the local flood hazard and not be a broad or generic discussion of flooding in general. Because the most important readers are elected officials and floodplain residents, the descriptions of the hazards should be in lay terms.

For CRS purposes, the community's planning may address only some of its floodplain, such as a problem stream, a lakeshore, or a repetitive loss area. The impact adjustment in Section 512.b will adjust the credit points to reflect that not all of the community's flood problems are covered in the plan.

As part of its coordination under step 3, the community should contact agencies that will have pertinent flood hazard information. These include the U.S. Army Corps of Engineers, the Natural Resources Conservation Service, the Bureau of Reclamation, the Tennessee Valley Authority, the National Weather Service, and state and regional planning, flood, and water resources management agencies.

Item (b): State and county emergency management agencies should have information on other natural hazards. Each state has prepared a multi-hazard mitigation plan, which is an excellent source of information on hazards that affect various parts of the state. All of the hazards listed in the state's mitigation plan that affect the community must be assessed in order to receive recognition as a local multi-hazard mitigation plan.

NOTE: *To qualify as a multi-hazard mitigation plan, the plan must address ALL of the community's flood and other natural hazards identified in the hazard assessment. Not only does an all-hazards plan help qualify for mitigation funds, it will better prepare the community for hazards other than flooding. It is common for communities to focus only on mitigation of flood problems because they occur more often. However, assessing the other hazards when preparing a flood plan can help address what can be done for all hazards, some of which may occur less frequently, but have a greater impact on the community.*

Phase II – Risk Assessment

5. Assess the problem (Maximum credit: 35 points) The credit for this step is the total of the following points, based on what is included in the assessment of the vulnerability of the community to the hazards identified in the previous hazard assessment step. To receive credit for this step, the assessment must include item (a) and must evaluate the hazard data in light of their impact on the community. Simply listing data, such as the names of the critical facilities or the number of flood insurance claims, will not suffice for credit.
 - (a) 2, if the plan includes an overall summary of the jurisdiction's vulnerability to each hazard identified in the hazard assessment (step 4) and the impact on the community. (required)
 - (b) 15, if the plan includes a description of the impact that the hazards identified in the hazard assessment (step 4) have on:
 - (1) life, safety, and health and the need and procedures for warning and evacuating residents and visitors. (5 points)
 - (2) critical facilities and infrastructure. (5 points)
 - (3) the community's economy and tax base. (5 points)
 - (c) 5, for including the number and types of buildings subject to the hazards identified in the hazard assessment.
 - (d) 4, if the assessment includes a review of all properties that have received flood insurance claims (in addition to the repetitive loss properties) or an estimate of the potential dollar losses to vulnerable structures.
 - (e) 4, if the plan describes areas that provide natural and beneficial functions, such as wetlands, riparian areas, sensitive areas, and habitat for rare or endangered species.
 - (f) 5, if the plan includes a description of development, redevelopment, and population trends and a discussion of what the future brings for development and redevelopment in the community, the watershed, and natural resource areas.

When a multi-jurisdictional plan is prepared, the critical facilities, building counts, and similar data must be presented for each community.

The previous step assessed the hazards facing the community. This step looks at the impact of those hazards. For example, a flood hazard area may or may not have flood problems. Flooding is viewed as a natural and even beneficial occurrence. A floodplain is only a problem if human development gets in the way of, or exacerbates, the natural flooding.

In this step, the community planners or planning committee members collect and summarize data on what is at risk. An inventory of buildings and other human-made structures is needed to ensure that all problem areas are addressed by the plan.

Item (b): Emergency management plans and HAZUS-MH analyses may provide information on the impact of the hazards on public safety and health, critical facilities, and the local economy (see Figure 510-1). For example, a review of past floods would show if there have been illnesses caused by the water or debris after the flood. A map that shows critical facilities can identify health and safety problems caused by disasters, such as when the wastewater treatment plant is flooded.

Item (c): The inventory should include how many and what types of buildings are affected (e.g., residential, commercial, industrial, with or without basements, etc.). In smaller communities, exact counts can be made using aerial photos or windshield surveys. In larger communities, these numbers will likely be approximates, although HAZUS-MH data sets and HAZUS-MH flood model analysis results can help.

Item (d): Data on building damage usually can be obtained from post-disaster damage assessment reports, flood insurance claims or disaster assistance data, and flood control studies. Emergency management offices and FEMA may be able to help locate such data. Particularly in areas that have experienced little or no serious flooding in recent history, a HAZUS-MH flood analysis can yield valuable information about the potential for flood damage and loss. Before running the analysis, the building/structure inventory data bases in HAZUS-MH should be reviewed and, if possible, augmented with local input.

Communities are encouraged to include repetitive loss areas in their problem assessment (Category C repetitive loss communities must base their plan on where repetitive flood insurance claims have been paid). In order to receive the 5 points credit under item (d), the community must request a printout of ALL the addresses of properties that have received flood insurance claims, not just the repetitive loss properties.

***NOTE:** If a community maintains flood insurance data on its repetitive loss properties, it must be remembered that such information is subject to the Privacy Act. Information such as the names of people and addresses of properties that have received repetitive flood insurance claims and the amounts of such claims may not be released to the public. Such information should be marked "For internal use only. Protected by the Privacy Act of 1974." Generic information, such as total claim payments for an area or data not connected to a particular property may be made public.*

HAZUS-MH – A Risk Assessment Tool

HAZUS-MH is a software program that contains models for estimating potential losses from earthquakes, floods, and hurricane winds. It can be of great assistance in the step 5 vulnerability assessment.

HAZUS-MH uses geographic information system (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of hurricane winds, floods, and earthquakes on populations. HAZUS-MH can also provide real-time data to support response and recovery after a natural disaster.

The utility and accuracy of the output depends on the amount of additional information provided by the local planner. HAZUS-MH provides for three levels of analysis.

- A Level 1 analysis yields a rough estimate based on the nationwide database and can be a good way to begin the risk assessment process and prioritize high-risk areas.
- A Level 2 analysis requires the input of additional or refined data and hazard maps that will produce more accurate risk and loss estimates. Assistance from local emergency management personnel, city planners, GIS professionals, and others may be necessary for this level of analysis.
- A Level 3 analysis yields the most accurate estimate of loss and typically requires the involvement of technical experts such as structural and geotechnical engineers who can modify loss parameters based on the specific conditions of a community. This level analysis will allow users to supply their own techniques to study special conditions, such as dam breaks and tsunamis.

HAZUS-MH includes a Building Inventory Tool that allows users to import building data and is most useful when handling large datasets (over 100,000 records), such as tax assessor records.

The HAZUS-MH Flood Model is capable of assessing riverine and coastal flooding. It estimates potential damage to all classes of buildings, essential facilities, transportation and utility lifelines, vehicles, and agricultural crops. The model addresses building debris generation and shelter requirements. Direct losses are estimated based on physical damage to structures, contents, and building interiors. The effects of flood warning are taken into account, as are flow velocity effects. HAZUS-MH includes the Flood Information Tool (FIT), which allows users to prepare local flood hazard and other pertinent data (such as FIRMs and DFIRMs) for use in the HAZUS-MH Flood Model.

The HAZUS-MH Hurricane Wind Model gives users in the Atlantic and Gulf Coast regions and Hawaii the ability to estimate potential damage and loss to residential, commercial, and industrial buildings. It also allows users to estimate direct economic loss, post-storm shelter needs and building debris.

The HAZUS-MH Earthquake Model provides loss estimates of damage and loss to buildings, essential facilities, transportation and utility lifelines, and population based on scenario or probabilistic earthquakes. The model addresses debris generation, fire-following, casualties, and shelter requirements. Direct losses are estimated based on physical damage to structures, contents, inventory, and building interiors.

HAZUS-MH can perform multi-hazard analysis by accessing the average annualized loss and probabilistic results from the hurricane wind, flood, and earthquake models and combining them to provide integrated multi-hazard reports and graphs. HAZUS-MH contains a third-party model integration capability that provides access and operational capability to a range of human-made and technological hazard models (nuclear and conventional blast, and radiological, chemical, and biological incidents) that will supplement the natural hazard loss estimation capability (hurricane wind, flood, and earthquake) in HAZUS-MH.

Copies of HAZUS-MH are available at no charge from the FEMA Distribution Center. Users can request that a 60-day trial/evaluation copy of ESRI's ArcGIS software be sent with HAZUS-MH. Users should be familiar with GIS software. HAZUS training is available at FEMA's Emergency Management Institute and elsewhere. Information is at <http://www.fema.gov/plan/prevent/hazus/index.shtm>.

Figure 510-1. HAZUS-MH.

Maps showing AREAS where claims have been paid can be made public. The data can be used for internal planning and can be very helpful in identifying problem areas that may not be apparent on a floodplain or drainage map.

Item (e): Along with flood protection, comprehensive floodplain management planning should review the unique natural features, natural areas, and other environmental and aesthetic attributes that may be present in the floodplain. Protecting and preserving these natural and beneficial floodplain functions yield flood protection benefits and also help integrate floodplain management efforts with other community goals and objectives.

Phase III – Mitigation Strategy

6. Set goals (Maximum credit: 2 points). The two credit points for this step are provided if the plan includes a statement of the goals of the community's floodplain management or hazard mitigation program. (REQUIRED)

The planning committee may need several meetings to work out goals statements to which everyone can agree. The goals should set the context for the subsequent review of floodplain management activities and drafting of the action plan. They should incorporate or be consistent with other community goals for the affected areas. A multi-hazard mitigation plan should have goals that address all the major hazards that face the community.

The goals guide the remainder of the planning process. Some plans set more specific objectives under each goal. The review of mitigation strategies and the selection of recommended activities should reflect the goals and objectives set at this step in the planning process.

Goal statements do not have to state how the goals will be attained, but they should address the priority problems as identified in the previous step. For example, a goal could state “protect buildings from flood damage” rather than “stop the flooding” or “remove the buildings from the floodplain.”

Example 511.f.

The following are some example goal and objective statements for Floodville:

Goal 1. Protect people from the safety and health hazards caused by natural forces.

Objective 1.1. Ensure that residents are given adequate warning of ice jam floods and tornadoes....

Goal 2. Protect public and private property from damage by natural hazards.

Objective 2.1. Protect the buildings in repetitive loss area #1 (Woodbridge Road and 40th Street) and repetitive loss area #2 (Adams and Cleveland Streets) from flood damage.

Objective 2.2. Prevent new development in the watershed from increasing runoff and resulting increases in flood flows into the City.

Objective 2.3. Ensure that new buildings are constructed to the latest wind and earthquake protection standards....

Goal 3. Improve the quality of life in Floodville.

Objective 3.1. Protect the Foster Creek bottomlands from development that will disturb habitats.

Objective 3.2. Expand Foster Creek Park to provide more recreational facilities to serve the growing north side of the City....

Phase III – Mitigation Strategy

7. Review possible activities (Maximum credit: 30 points) The plan must describe those activities that were considered and note why they were or were not recommended (e.g., they were not cost-effective or they did not support the community's goals). (REQUIRED)

If an activity is currently being implemented, the plan must note whether it should be modified. The discussion of each activity needs to be detailed enough to be useful to the lay reader.

The credit for this step is the total of the following points based on which floodplain management or hazard mitigation activities are reviewed in the plan.

- (a) 5, if the plan reviews preventive activities, such as zoning, stormwater management regulations, building codes, and preservation of open space and the effectiveness of current regulatory and preventive standards and programs;
- (b) 5, if the plan reviews property protection activities, such as acquisition, retrofitting, and flood insurance;
- (c) 5, if the plan reviews activities to protect the natural and beneficial functions of the floodplain, such as wetlands protection;
- (d) 5, if the plan reviews emergency services activities, such as warning and sandbagging;
- (e) 5, if the plan reviews structural projects, such as reservoirs and channel modifications; and
- (f) 5, if the plan reviews public information activities, such as outreach projects and environmental education programs.

The objective of this step is to ensure that all possible measures are explored, not just the traditional approaches of flood control, acquisition, and regulation of land use. Figure 510-2 provides a list of some of the types of activities that could be reviewed under each of the six categories. More information on the activities is provided in *Example Plans*.

1. **Preventive** activities keep problems from getting worse. The use and development of floodprone areas is limited through planning, land acquisition, or regulation. They are usually administered by building, zoning, planning, and/or code enforcement offices.
 - Planning and zoning
 - Open space preservation
 - Floodplain regulations
 - Building codes
 - Stormwater management
 - Drainage system maintenance
 - Dune and beach maintenance
2. **Property protection** activities are usually undertaken by property owners on a building-by-building or parcel basis. They include:
 - Relocation
 - Acquisition
 - Building elevation
 - Retrofitting
 - Sewer backup protection
 - Insurance
3. **Natural resource protection** activities preserve or restore natural areas or the natural functions of floodplain and watershed areas. They are usually implemented by parks, recreation, or conservation agencies or organizations.
 - Wetlands protection
 - Erosion and sediment control
 - Best management practices
 - Coastal barrier protection
4. **Emergency services** measures are taken during an emergency to minimize its impact. These measures are the responsibility of city or county emergency management staff and the owners or operators of major or critical facilities.
 - Hazard warning
 - Hazard response
 - Critical facilities protection
 - Health and safety maintenance
5. **Structural projects** keep floodwaters away from an area with a levee, reservoir, or other flood control measure. They are usually designed by engineers and managed or maintained by public works staff.
 - Reservoirs
 - Levees/floodwalls/seawalls
 - Diversions
 - Channel modifications
 - Beach nourishment
 - Storm sewers
6. **Public information** activities advise property owners, potential property owners, and visitors about the hazards, ways to protect people and property from the hazards, and the natural and beneficial functions of local floodplains. They are usually implemented by a public information office.
 - Map information
 - Outreach projects
 - Real estate disclosure
 - Library
 - Technical assistance
 - Environmental education

Figure 510-2. Floodplain management categories and activities.

The range of activities should be evaluated for each site or area affected. While some of them may be quickly eliminated as inappropriate, most deserve careful consideration, especially to ensure full understanding of their costs and benefits. Questions about technical aspects or agency programs can be handled during coordination with other agencies and organizations (see step 3).

The community should strive for a balanced program, selecting measures from more than one category of floodplain management activity. In every case, the community should implement preventive activities to keep its flood problems from getting worse and to protect new construction from the effects of natural hazards.

Phase III – Mitigation Strategy

8. Draft an action plan (Maximum credit: 70 points). The action plan specifies those activities appropriate to the community's resources, hazards, and vulnerable properties.

For each recommendation, the action plan must identify who does what, when it will be done, and how it will be financed. The actions must be prioritized and include a review of the benefits of the proposed projects and their associated costs. (REQUIRED) A multi-hazard mitigation plan must identify actions that address both existing and new infrastructure and buildings.

The credit for this step is based on what is included in the action plan. Credit is provided for a recommendation on floodplain regulations, provided it recommends a regulatory standard that exceeds the minimum requirements of the NFIP.

- (a) 10, if the action plan includes flood-related recommendations for activities from two of the six categories credited in step 7, Review possible activities.
- (b) 20, if the action plan includes flood-related recommendations for activities from three of the six categories credited in step 7, Review possible activities.
- (c) 30, if the action plan includes flood-related recommendations for activities from four of the six categories credited in step 7, Review possible activities.
- (d) 45, if the action plan includes flood-related recommendations for activities from five of the six categories credited in step 7, Review possible activities.
- (e) 10 additional points are provided if the action plan establishes post-disaster mitigation policies and procedures.

(f) 10 additional points are provided if the action plan's recommended natural resource protection activities include recommendations from a Regional Habitat Conservation Plan as credited under Section 511.c.

(g) 5 additional points are provided if the plan includes action items (other than public information activities) to mitigate the effects of the other natural hazards identified in the hazard assessment (step 4, item (b)).

If the plan calls for acquiring properties, there must be a discussion of how the project(s) will be managed and how the land will be reused.

When a multi-jurisdictional plan is prepared, it must have action items from at least two of the six categories that directly benefit each community seeking CRS credit.

The first consideration in the selection of recommended activities is to ensure that the measures are technically appropriate for the hazard threat. The measures should be appropriate for community development trends, needs, and goals. The actions for different hazards need to be coordinated, so an activity to address one does not adversely affect an activity for another hazard. For example, requiring elevation of floodplain buildings on open foundations may expose them to greater wind or earthquake damage.

The action plan needs to be affordable, implementable, and permitted by local, state, and federal regulations. Where possible, each measure should have objectives that are easy to measure when accomplished.

The actions must be prioritized. When prioritizing mitigation actions, the planners need to consider the benefits that would result from the mitigation actions and projects versus the cost of those actions. Note that this is not a requirement for a cost-benefit analysis for every action item. However, an economic evaluation is essential for selecting one or more actions from among many competing ones. See Example 511.h.

To qualify as a multi-hazard mitigation plan, the plan must include a "process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate." The action items relating to preventive activities should clarify how this is done. For example, an action item could recommend that the next time the zoning ordinance is revised, flood and landslide hazard areas be considered when determining allowable uses.

There is no requirement that a floodplain management plan identify expensive or massive structural flood control projects. The plan should recommend only those activities that the community can be assured will be implemented through its own resources. If outside funding support is included, the programs should be identified and researched to ensure that the projects are eligible and the community has a chance of receiving the funds. Many of the activities could receive CRS credit once they are implemented.

Item (e): Post-disaster policies should account for the expected damage from a base flood or other disaster. For example, the action plan should identify the areas likely to be worst hit and the policies should determine whether they will be rebuilt if substantially damaged. Post-disaster mitigation procedures should assign responsibilities for public information, code enforcement, planning, and other efforts that encourage, mandate, and/or fund loss reduction activities.

Example 511.h.

The following is an excerpt from Floodville's Action Plan:

The Floodplain Management Planning Committee reviewed and discussed many things that can be done to protect people and property. It was recognized that priorities must be set so the City's resources can focus on those activities that will do the most good. Accordingly, four factors were used to prioritize what should be pursued:

1. Ensure the activity is feasible and affordable,
2. Ensure that the benefits outweigh the costs,
3. Reduce repetitive losses, and
4. Implement some highly visible projects as quickly as possible.

Factors 1 and 2 need accurate estimates of the costs of the projects. In some cases, additional planning and cost estimates are needed to verify affordability and the benefits vs. the costs before the project should be implemented.

Many different activities and projects were discussed, but, following the four factors, the Committee settled on 10 action items. The top priorities are the first three. **[NOTE: Only the first five action items appear in this example].**

1. The Public Information Officer will distribute a flood hazard notice to each resident of the Special Flood Hazard Area (SFHA) each year. It will include the warning procedures for ice jam flooding and what to do when warnings are issued.

Action: Have the notices in the mail by the beginning of winter each year.

Budget: staff time (operating funds).

2. Six properties in repetitive loss area #1 on the west side of 40th Street, should be purchased. The sites should be cleared and added to Foster Creek Park.

Action: The City Planning Office will apply for funding from FEMA's Flood Mitigation Assistance Program by August 2005.

Budget: staff time (operating funds).

Action: The Park District will acquire the properties by August 2006.

Budget: Flood Mitigation Assistance Program.

Action: Clear the properties and restore them to approximate a natural state by August 2007.

Budget: Park District capital improvement budget.

3. The Planning Commission will review amendments to the floodplain regulation ordinance to prohibit new buildings, filling, or other land disturbance in the Foster Creek bottomlands.

Action: Report recommended ordinance language to the City Council by March 2006.

Budget: staff time (operating funds).

4. The City Engineer will draft a comprehensive stormwater management plan for the ditch draining the southeast part of town to identify the best locations for stormwater facilities and set retention standards for new developments.

Action: Complete the first draft by September 2006.

Budget: staff time (operating funds).

5. The City Engineer will prepare a cost estimate for enlarging the culvert under the railroad tracks to accommodate the base flood. The estimate will include a study of the impact of increased flows on downstream properties, channel banks, and habitat.

Action: Complete the study by January 2006.

Budget: staff time (operating funds).

Phase IV – Plan Maintenance

9. Adopt the plan (Maximum credit: 2 points) The 2 credit points for this step are provided if the plan and later amendments are officially adopted by the community's governing body. (REQUIRED)

When a multi-jurisdictional plan is prepared, it must be adopted by the governing board of each community seeking CRS or multi-hazard mitigation plan credit.

The plan must be an official plan of the community, not an internal staff proposal. Regional plans are not adequate unless they specifically address the community's natural hazards and the community's governing body adopted the plan.

Phase IV – Plan Maintenance

10. Implement, evaluate, and revise (Maximum credit: 15 points) The credit for this step is the total of the following points based on how the community monitors and evaluates its plan.

- (a) 2, if the community has procedures for monitoring implementation, reviewing progress, and recommending revisions to the plan in an annual evaluation report. The report must be submitted to the governing body, released to the media and made available to the public. (REQUIRED)

(b) 13, if the evaluation report is prepared by the same planning committee that prepared the plan that is credited in step 2(a) or by a successor committee with a similar membership that was created to replace the planning committee and charged with monitoring and evaluating implementation of the plan.

To maintain this credit, the community must submit a copy of its annual evaluation report with its recertification each year and update the plan at least every five years.

To be useful, planning must be dynamic. The plan should not sit on a shelf gathering dust once it is completed. Therefore, the community must have an evaluation and update process.

No plan is perfect. As implementation proceeds, flaws will be discovered and changes will be needed. Not only can hazard conditions change but also goals and objectives may change. If a community is hit by a tornado, the planning may be changed to focus attention on the newly damaged areas in the SFHA. Many communities have periodic meetings of the planning committee to review progress to date and recommend changes to the projects for the next year.

The plan must describe the how, when, and by whom the plan will be monitored. Monitoring may include periodic reports by agencies involved in implementing projects or activities, site visits, phone calls, and meetings conducted by the person responsible for overseeing the plan. The plan must also include a description of how, when, and by whom the plan will be evaluated, and should include the criteria used to evaluate the plan.

Those involved in developing and implementing the plan should meet periodically to review progress toward the objectives and identify changes or revisions that should be made. This is usually done monthly or quarterly, but must be done at least annually to facilitate preparation of the annual evaluation report.

FAILURE TO SUBMIT THE EVALUATION REPORT WITH THE ANNUAL RECERTIFICATION WILL RESULT IN LOSS OF THE PLANNING CREDIT (I.E., FMP = 0). LOSS OF CREDIT FOR THIS ACTIVITY WILL CAUSE A REPETITIVE LOSS CATEGORY C COMMUNITY TO REVERT TO A CLASS 10.

Changes should be made in the action plan when opportunities arise to add new activities or complete some items ahead of schedule. The plan should also be revised if it is found that some activities cannot be completed on the original timetable. The revisions must be adopted by the governing body as required under step 9.

b. Repetitive loss area analysis (RLAA)

Up to 50 points are provided for conducting area analyses of all of the community's repetitive loss areas. An area analysis is prepared according to the following criteria:

1. All repetitive loss areas must be mapped as described in Section 503.b. If the community does not conduct an analysis of all the areas, it will be reflected through the impact adjustment in Section 512.
2. Data must be collected on each building in the area(s) using the “limited data view” of the National Flood Mitigation Data Collection Tool. The database file created by the National Flood Mitigation Data Collection Tool must be made available to FEMA and the state, upon request.
3. A five-step process must be followed. The steps do not have to be done in the order listed.
 - Step 1. Advise all the property owners in the repetitive loss areas that the analysis will be conducted. This must be sent directly to each property owner and cannot be done via a newspaper or newsletter notice or article.
 - Step 2. Collect data on each building and determine the cause(s) of the repetitive damage.
 - Step 3. Review alternative approaches and determine whether any property protection measures or drainage improvements are feasible. The review must look at all of the property protection measures listed in Figure 510-2 that are appropriate for the types of buildings affected.
 - Step 4. Contact agencies or organizations that may have plans that could affect the cause or impacts of the flooding.
 - Step 5. Document the findings, including a map showing all parcels in the area, recommendations, and how the recommendations will be funded.
4. Each area analysis document must be approved by the head of the appropriate community department. It does not have to be circulated to or adopted by the community’s governing board, but it does have to be made available to any inquirer, including residents of the repetitive loss area(s).
5. The community must prepare an annual report on progress toward implementing the recommendations.

As with a floodplain management plan, CRS credit is dependent on the community’s following an appropriate process. The five steps for an area analysis are less involved than the 10-step floodplain management planning process, but the analysis must look at each building in the repetitive loss area(s).

Although all five steps must be completed, they do not have to be done in the order listed. For example, the planners may want to contact agencies and organizations to see if they have useful data before they start the analysis. The community may notify the property owners before the process starts (in order to ask for more information and advise them that someone will be conducting a survey of their homes) or it may want to notify them at the end of the process (when they can be told that there is a report on the findings).

The National Flood Mitigation Data Collection Tool has been developed by FEMA to gather information related to risk, building construction, and costs in order to help make decisions about what mitigation measures are appropriate for a floodprone property. The tool is in Microsoft Access format and is available free to any public agency.

The tool may be populated with insurance claim data for the properties. The local planners need to remember that such information is subject to the Privacy Act, which prohibits public release of the names of policy holders or recipients of financial assistance and the amount of the claim payment or assistance. However, maps showing AREAS where claims have been paid can be made public. The data can be used for internal planning and can be helpful in identifying problem areas.

The tool has two levels of data collection effort. Limited level data can normally be collected through a windshield-type survey while completing the entire detailed data section may require elevation surveying and structural inspections inside the building. The detailed data are collected when the limited effort concludes that mitigation is possible and the additional data is needed to determine the most appropriate mitigation measure and its benefits and costs.

In a companion publication, *Development of Cost Effective Mitigation Measures for Floodprone Structures*, FEMA shows how to use the data to determine cost-effective retrofitting or other mitigation measures for each building.

More information on conducting an “area analysis” is described in FEMA’s *Reducing Damage from Localized Flooding: A Guide for Communities*. The end product is a report that should include:

- A summary of the process that was followed;
- A summary of residents’ comments and/or concerns;
- The problem statement with a map of all parcels in the area affected and/or the drainage basin (AND WITHOUT CLAIMS INFORMATION PROTECTED BY THE PRIVACY ACT).

The report must be reviewed and accepted by the head of the department responsible for conducting the analysis. It, and the annual progress report, must be made available to any inquirer, including residents and owners of properties in the repetitive loss areas.

As explained in Section 502, a Category C community has 10 or more properties on FEMA’s repetitive loss list. To fulfill the repetitive loss planning prerequisite for participating in the CRS, a Category C community must either prepare and adopt a floodplain management plan that covers its repetitive loss areas or conduct area analyses of all of its repetitive loss areas.

A community may receive credit for either a floodplain management plan, area analyses, or both. Area analyses may be conducted during the floodplain management planning or a floodplain management plan may identify areas needing analyses, which are conducted after the plan is adopted. For CRS credit, a separate document must be published for each area.

c. Habitat conservation plan (HCP)

HCP = the total of the following points:

- 10, if the community has adopted a regional Habitat Conservation Plan or other plan that explains and recommends actions to protect rare, threatened, or endangered aquatic or riparian species. The plan must have been adopted by the community's governing board and there must be documentation that the plan is being implemented. The plan must identify:
 - the species in need of protection,
 - the impact of new development on their habitat,
 - alternative actions that could be taken to protect that habitat,
 - what actions are recommended to protect that habitat and why they were selected from the alternatives, and
 - how the recommendations will be funded.
- 5, if the plan has also been accepted as a Habitat Conservation Plan by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service.

Regional Habitat Conservation Plans are “broad-based, landscape level planning tools” that identify steps that reduce conflicts between land development activities and the need to protect threatened or endangered species. They can prove very useful in providing ways for development to comply with the Endangered Species Act and to reduce the costs of conservation activities on individual property owners. For more information, see the *Habitat Conservation Planning Handbook*.

This credit of 10 points is provided if the community has adopted a habitat conservation plan or a similar plan with the objective of protecting rare, threatened, or endangered species. The credit of 10 points in step 8, item (f) is also provided if the community's floodplain management plan includes recommendations from its habitat conservation or similar plan.

There is credit of 15 points under Section 431.g.3 if the community has adopted regulations pursuant to its Habitat Conservation plan. A Habitat Conservation Plan can also help with credit in Section 421.c by documenting the value of preserving natural areas as open space.

512 Impact Adjustment

a. Option 1:

1. $rFMP = 1.0$ if the planning covers all of the community's known flood hazard areas.
2. $rRLAA = 1.0$ if all repetitive loss areas identified in Section 503 are covered by repetitive loss area analyses.

A Category C Repetitive loss community must use Option 1 if it is preparing an area analysis to meet the CRS participation prerequisite specified in Section 502.

b. Option 2:

1. $rFMP = 0.25$ if the planning covers either all of the community's repetitive loss areas or at least 25% of the community's known flood hazard areas.
2. $rRLAA = 0.25$ if an area analysis has been prepared for at least one repetitive loss area. There is no credit if only some buildings in a repetitive loss area are covered in the analysis—the analysis must include all buildings in an area. Option 2 is used if not all of the areas have been analyzed.

c. Option 3:

$$rRLAA = \frac{bAA}{bRLA}, \text{ where}$$

bAA = the number of buildings in the repetitive loss areas where area analyses have been completed

$bRLA$ = The number of buildings in all the community's repetitive loss area(s).

There is no impact adjustment for the Habitat Conservation Plan credit (HCP). Option 1 can only be used if the planning covers all of the community's known flood hazard areas. "Known flood hazards" means the SFHA shown on the FIRM, repetitive loss areas, areas not mapped on the FIRM that have flooded in the past, and surface flooding identified in existing studies (see step 4).

If the planning covers all repetitive loss areas, then the Option 2 default impact adjustment ratio of 0.25 may be used for FMP. This option can also be used if the community's planning effort addressed only one or two watersheds, which cover at least 25% of all of the

community's known flood problems. If the area analyses cover all repetitive loss areas, then Option 1 is used for RLAA.

A Category C repetitive loss community must cover all of its repetitive loss areas to meet the CRS prerequisite described in Section 503. This can be done with a floodplain management plan that covers all the repetitive loss areas or area analyses that cover all the repetitive loss areas.

Example 512.c-1. Floodville's planning covers all of the SFHA and other areas of known flood hazard. The City chooses option 1 and rFMP = 1.0.

Example 512.c-2. Gulf Beach County has many flood hazard areas and the staff is unable to prepare a plan that addresses all of them. The County has prepared a floodplain management plan that addresses all three of its repetitive loss areas. These areas represent approximately 10% of all of the buildings in the County's SFHA. The County chooses Option 2 and rFMP = 0.25.

If either Floodville or Gulf Beach County prepared repetitive loss area analyses for ALL of their repetitive loss areas, then rRLAA = 1.0.

513 Credit Calculation

- a. FMP = the total of the credit points for the 10 steps in Section 511.a. If the credit for any one of the 10 steps is 0, then FMP = 0.
- b. $c510 = (FMP \times rFMP) + (RLAA \times rRLAA) + HCP$

Example 513-1.

Floodville's plan was prepared using the following process:

	<u>Item Score</u>	<u>Step Total</u>
Phase I – Planning Process		
1. Organize to prepare the plan: The plan was prepared by the City Planner with help from a committee with representatives from other departments.	2 6	 8
2. Involve the public News releases, newsletter articles, and the website invited the public to comment at		

	<u>Item Score</u>	<u>Step Total</u>
the beginning of the planning process	5	
Questionnaires were sent to residents with one of the City's annual outreach projects.	5	
A public meeting was held to review the draft.	15	25
3. Coordinate with other agencies		
The plan reviewed the community's needs, goals and plans for the area.	3	
Letters were sent to six agencies asking for input.	1	
Meetings were held with key agencies.	10	
The draft action plan was sent to other agencies.	3	17
Phase II – Risk Assessment		
4. Assess the hazard		
The plan includes a map and description of the flooding in the SFHA and the newly mapped area, and the City's flood history.	15	15
5. Assess the problem		
An overall summary of the impact of the hazards.	2	
The plan discusses the impact on life, safety, and health.	5	
The plan describes the impact on critical facilities.	5	
The plan lists the numbers and types of buildings.	5	17
Phase III – Mitigation Strategy		
6. Set goals	2	2
7. Review possible activities		
The plan reviews preventive activities.	5	
The plan reviews property protection activities.	5	
The plan reviews natural resource protection activities.	5	
The plan reviews structural projects.	5	
The plan reviews public information activities.	5	25
8. Draft an action plan		
The action plan recommends preventive, property protection, natural resource protection, structural projects, and public information activities.	45	45
Phase IV – Plan Maintenance		
9. Adopt the plan	2	2
10. Implement, evaluate, and revise		
The staff has prepared procedures for the annual evaluation.	2	2
Total points, FMP =		158
$c510 = (FMP \times rFMP) + (RLAA \times rRLAA) + HCP = (159 \times 1.0) + 0 = 158$		

514 Credit Documentation

If the community already has a floodplain management, hazard mitigation, or similar plan that meets the 10-step credit criteria, it need not prepare a new plan just for this CRS credit.

The community must submit the following:

- a. The activity worksheet or plan review crosswalk that identifies the page or section number where each credited item is located in the floodplain management or hazard mitigation plan.
- b. A copy of the floodplain management or hazard mitigation plan. At the time of cycle verification, this section applies to the five-year update to the previously credited plan. A description of the process used to develop (or update) the plan must be included, either as part of the plan or attached to it. While some of the steps can be explained in a separate memo, the following must appear in the plan document:
 - Step 1. a description of the plan preparation process,
 - Step 4. the hazard assessment,
 - Step 5. the problem assessment,
 - Step 6. goals of the floodplain management or hazard mitigation program,
 - Step 7. the review of possible activities,
 - Step 8. the action plan, and
 - Step 10. how the plan will be periodically evaluated and revised.
- c. Documentation showing how the public was involved in preparing or reviewing the plan, including a list of the members of the planning committee and their affiliations and a copy of the notice(s) advising residents about the public meeting(s) held pursuant to step 2(b) and (c), and a record of the meeting(s).
- d. Copies of correspondence, meeting notes, or other materials that document the coordination with other municipalities, agencies, and organizations credited under Sections 511.a3(b)—(f).

The notice of the public input meeting(s) should be in the form of letters to floodplain residents, a notice sent to all residents, or a newspaper article or advertisement. An inconspicuous legal notice in the classified section of the newspaper will not be sufficient for CRS credit. If very few residents are affected, as may be the case for planning that addresses

only a repetitive loss area, a written record that the residents were called would be sufficient documentation.

A record of the meeting is also needed. This could be the minutes of the public meeting, a memo for the record, or a list of the issues raised by those who attended.

- e. Documentation showing that the floodplain management plan (or the five-year update) and/or the Habitat Conservation Plan have been adopted by the community's governing body. When a multi-jurisdictional plan is prepared, it must be adopted by the governing board of each community seeking CRS credit. If the community is applying for credit for a Habitat Conservation Plan that has been accepted by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, the documentation must include a written record of that acceptance.

Normally a plan is adopted by a formal resolution of the city council, county board, or other governing body. A copy of the resolution or a copy of the minutes for the meeting are appropriate documentation to show that the plan was officially adopted.

- f. A copy of each repetitive loss area analysis to be credited and a memo or other documentation showing that the head of the appropriate department has approved it. The National Flood Mitigation Data Collection Tool database file must also be provided, if requested.

The community must submit the following documentation with its annual CRS recertification (see Section 214):

- g. An annual report on evaluating progress toward implementing the action plan's objectives and/or the recommendations of the area analyses. A single report may be prepared for all area analyses. The evaluation report must be submitted to the governing body, released to the media, made available to the public, and included as part of the community's annual recertification. The report must include the following:
 - 1. A description of how the evaluation report was prepared and how it is submitted to the governing body, released to the media, and made available to the public.
 - 2. How the reader can obtain a copy of the original plan or area analysis report;
 - 3. A review of each recommendation or action item in the action plan or area analysis report, including a statement on how much was accomplished during the previous year;
 - 4. A discussion of why any objectives were not reached or why implementation is behind schedule; and
 - 5. Recommendations for new projects or revised recommendations.

The submittal must include other documentation to demonstrate that the evaluation report was submitted to the governing body, released to the media, made available to the public and/or prepared by the same planning committee that prepared the plan.

If the community fails to submit an annual progress report with its recertification, there is no credit (FMP = 0 and RLAA = 0). Without continued credit, a category C repetitive loss community will revert to a Class 10.

The objective of the annual evaluation report and the five-year plan update is to ensure that there is a continuing and responsive planning process. It is required for the community to continue to receive the credit for its floodplain management planning. Continued credit for floodplain management planning is dependent on the report's being submitted with the community's annual CRS recertification.

The review of each recommendation in the action plan or area analysis report must state how much was accomplished during the previous year. Where possible, the objectives and progress toward them should be measurable (e.g., "five of the six lots slated for acquisition were purchased" or "we improved one mile of stream channel"). Where a recommendation or action item is not scheduled to be addressed during the year, it should still be listed and so noted (e.g., "scheduled for 2007").

If appropriate, new projects or revised objectives may be established. For example, if fewer people requested technical advice than expected, the next year's plan might have a smaller target number. If the original plan's projects or objectives are changed, the evaluation report or a plan amendment must be adopted by the governing body. If an area analysis' recommendations are changed, the change must be approved by the appropriate department head.

Example 514.f-1. Floodville's staff prepares the annual evaluation report by March 1 each year. This is added to the City Manager's March report to the City Council, which is copied to the local media, the Chamber of Commerce, and three neighborhood organizations that helped prepare the plan. Members of the public may review copies in City Hall.

FAILURE TO SUBMIT THE FLOODPLAIN MANAGEMENT PLAN'S EVALUATION REPORT WITH THE ANNUAL RECERTIFICATION OR THE FIVE-YEAR UPDATE AT THE FOLLOWING CYCLE VERIFICATION WILL RESULT IN LOSS OF THE PLANNING CREDIT (I.E., FMP = 0). FAILURE TO SUBMIT THE AREA ANALYSIS' EVALUATION REPORT WITH THE ANNUAL RECERTIFICATION WILL RESULT IN LOSS OF THE CREDIT (I.E., RLAA = 0). LOSS OF CREDIT FOR THIS ACTIVITY WILL CAUSE A REPETITIVE LOSS CATEGORY C COMMUNITY TO REVERT TO A CLASS 10.

h. An update to the plan, prepared at least every five years. If it has been more than five years since the plan was adopted, an update will be required at the time the community applies for the credit. The five-year plan update will be scored according to the *Coordinator's Manual* currently in effect, not the version used when the community originally applied. The update must include the following steps:

1. Steps 1 and 2: If the original planning process included a committee, then in order to keep the credit provided under step 1, item (b) or step 2, item (a), the update must be conducted by a committee that meets the criteria identified in those steps.
2. Step 2: If the original planning process received credit for the final public meeting credited under step 2, item (c), then in order to keep this credit the community must also conduct a public meeting that reviews and receives comments on the draft update.
3. Step 3, item (a): The update must include a review of new studies, reports, and technical information and of the community's needs, goals, and plans for the area that have been published since the plan was prepared.
4. Steps 4 and 5: The hazard and problem assessments must be reviewed and brought up to date. The assessments must account for:
 - new floodplain or hazard mapping,
 - annexation of floodprone areas,
 - additional repetitive loss properties,
 - increased development in the floodplain or watershed,
 - new flood control projects,
 - lack of maintenance of flood control projects,
 - major floods or other disasters that occurred since the plan was adopted, and
 - any other change in flooding conditions and/or development exposed to flooding or the other hazards covered in the plan.
5. Step 8: The action plan must be revised to account for projects that have been completed, dropped, or changed and for changes in the hazard and problem assessments, as appropriate.
6. Step 9: The update must be adopted by the community's governing board.

An annual evaluation that includes these steps may qualify as the five-year update.

If the community fails to submit the five-year update by October 1 of the year following its next cycle verification, there is no planning credit (FMP = 0). Without continued credit under this activity, a category C repetitive loss community will revert to a Class 10.

515 For More Information

Additional information, reference materials, and examples can be found at the CRS Resource Center at <http://training.fema.gov/EMIWeb/CRS/>.

- a. See Appendix E to order a free copy of *Example Plans*. It is also on the CRS website, <http://training.fema.gov/EMIWeb/CRS/>.
- b. HAZUS-MH is a risk assessment software program that is described in Figure 510-1. Copies are available free from FEMA. Users need to be familiar with operating GIS software. Training is also available. More information is available at <http://www.fema.gov/plan/prevent/hazus/index.shtm>.
- c. The National Flood Mitigation Data Collection Tool gathers information related to risk, building construction, and costs in order to help make decisions about what mitigation measures are appropriate for a floodprone property. The Tool is in Microsoft Access format and is available free to any public agency. Copies of the software can be obtained from the CRS at NFIPCRS@ISO.com or 317-848-2898.
- d. Contact state or regional planning, water resources, natural resources, environmental protection, or NFIP coordinating agencies for information on state and federal agencies that can assist in preparing a floodplain management plan.
- e. The following publications discuss the planning process and the variety of measures that should be examined. They are available free from

FEMA Distribution Center
P.O. Box 2010
Jessup, MD 20794-2012
800-480-2520
Fax: 301-362-5335

FEMA has a series of “how-to guides” on planning, to help communities meet the multi-hazard mitigation planning criteria. They can be found at

http://www.fema.gov/plan/mitplanning/planning_resources.shtm#1.

- *Getting Started: Building Support for Mitigation Planning* (FEMA 386-1) covers planning Phase I and CRS planning steps 1–3.
- *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA 386-2) covers planning Phase II and CRS planning steps 4–5.
- *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies* (FEMA 386-3) covers planning Phase III and CRS planning steps 6–8.
- *Bringing the Plan to Life: Implementing the Hazard Mitigation Plan* (FEMA 386-4) covers planning Phase IV and CRS planning steps 9–10.
- *Integrating Manmade Hazards into Mitigation Planning* (FEMA 386-7).

Reducing Damage from Localized Flooding: A Guide for Communities, FEMA 511, 2005. Also available at <http://www.fema.gov/library/viewRecord.do?id=1448>.

Development of Cost Effective Mitigation Measures for Floodprone Structures, FEMA, 2005.

Planning for Post Disaster Recovery and Reconstruction, American Planning Association (APA) Planning Advisory Service, 346 pages, APA Report # 483/484, FEMA 421, 1998.

Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability, 43 pages, FEMA 364, 2000. Also available for downloading at <http://www.fema.gov/plan/mitplanning/linkmitliv.shtm>.

Reducing Losses in High Risk Flood Hazard Areas—A Guidebook for Local Officials, FEMA 116, 1987. Also available for downloading at <http://www.fema.gov/library/viewRecord.do?id=1508>.

“Mitigation Benefit Cost (BCA) Toolkit Compact Disc.” This CD includes all the FEMA BCA software, technical manuals, BCA training course documentation, and other supporting material and BCA guidance. Copies can be obtained by calling FEMA’s toll-free BC Hotline at 1-866-222-3580.

- f. Rural communities can request help on this activity from the Natural Resources Conservation Service. Requests should be submitted to the local soil and water conservation district, which is usually located in the county seat.
- g. The U.S. Army Corps of Engineers can also provide technical information and advice to communities interested in preparing a comprehensive floodplain management plan. Requests for assistance should be submitted to the Flood Plain Management Services Coordinator at the appropriate District Office of the Corps. Corps offices can be found at <http://www.usace.army.mil/ContactUs.html>.
- h. The Rivers and Trails Conservation Assistance Program of the National Park Service provides planning assistance to communities interested in setting flood protection goals and identifying nonstructural options. The Park Service provides experienced staff to help communities focus on the grass-roots involvement of residents when developing a plan. For more information, contact:

National Park Service
Center for Recreation and Conservation
1849 C St., N.W.
Washington, D.C. 20240-0001
(202) 565-1200

- i. The following publications can also be of assistance. They can be ordered from their publisher by calling the number noted.

A Multi-Objective Planning Process for Mitigating Natural Hazards, FEMA and the National Park Service, 1995, (303) 235-4830 or (303) 969-2850.

Flood Proofing: How to Evaluate Your Options, U.S. Army Corps of Engineers, 1994. Also available for downloading at <https://www.nwo.usace.army.mil/nfpc/publications.html>.

- j. More information on Habitat Conservation Plans can be found in *Habitat Conservation Planning Handbook*, U.S. Fish and Wildlife Service and National Marine Fisheries Service, November 1996. See Appendix F for the appropriate office of the Fish and Wildlife Service.
- k. The Association of State Floodplain Managers has prepared a floodplain management planning kit. It consists of reference materials, masters for handouts, and a two-part video that explains the 10-step process to the general public and is meant to be shown at the first meeting of a planning committee. Order *Flood Mitigation Planning—The First Steps* through the ASFPM website, <http://www.floods.org> or call (608) 274-0123, \$12.

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520 ACQUISITION AND RELOCATION

Summary of Activity 520

521 Credit Points. There are two elements in this activity for a maximum of 3,200 points.

- a. Buildings acquired or relocated (bAR): Up to 3,200 points are provided based on the number of buildings acquired, relocated, or otherwise cleared from the regulatory floodplain since the effective date of the Flood Insurance Rate Map (FIRM).
- b. Buildings on the repetitive loss list that have been acquired or relocated (bRL). Repetitive loss buildings counted for this element may have been located anywhere in the community.
- c. Severe Repetitive Loss Properties that have been acquired, relocated, or otherwise removed from the problem site (bSRL)

522 Impact Adjustment. All buildings must have been removed from the SFHA in order to receive the full 3,200 points for this activity. The credit points are adjusted in one of two ways.

- a. Under Option 1, if 20 or fewer buildings have been removed, a default impact adjustment gives 5 points for each building.
- b. Under Option 2, the credit points are adjusted to reflect the number of buildings that have been acquired or relocated from the Special Flood Hazard Area (SFHA).

523 Credit Calculation.

- a. Under Option 1, the number of buildings (bAR) is multiplied by the default value of 5; the number of buildings on the repetitive loss list (bRL) is multiplied by 10, and the number of Severe Repetitive Loss Properties (bSRL) is multiplied by 15.
- b. Under Option 2, the impact adjustment ratio is multiplied by 32.

524 Credit Documentation. The community must have the following:

- a. A map showing the parcels where floodprone buildings have been demolished or relocated since the effective date of the FIRM and the total number of such buildings (bAR, bRL, and bSRL).
- b. Documentation that shows that each site credited under this activity can also qualify for credit as preserved open space in Activity 420.
- c. [If the community is using Option 2] Calculations showing the number of buildings in the SFHA.
- d. Real estate or permit records that document the date of removal of each building.
- e. [If credit is being requested for buildings outside the SFHA] Documentation showing that floodplain regulations are in effect in the area outside the SFHA.

525 For More Information.

520 ACQUISITION AND RELOCATION

Credit is provided for acquiring, relocating, or otherwise clearing buildings out of the flood hazard area.

Background: The surest way to protect a building from flood damage is to remove it from the floodplain. The most common method of doing this is for a government agency to acquire the property and demolish the building or move it to high ground. A less frequently used approach is for the owner to relocate it to high ground, either on the same lot or to a different one.

Activity Description: This activity credits either approach as long as an insurable building is removed from the path of flooding and the community can document that the property will stay vacant. The credit is based on the number of buildings cleared as a portion of the total number of buildings in the community's Special Flood Hazard Area (SFHA). The credit is provided only if the site qualifies for credit under Activity 420 (Open Space Preservation).

There is, in effect, duplicate credit for purchasing a property and maintaining it as public open space because the vacant lot must also qualify for the open space preservation credit under Section 421.a of Activity 420 (Open Space Preservation). If the community can obtain or require a deed restriction at the time of acquisition or relocation, credit is also provided under Section 421.b.

No Community Rating System (CRS) credit is provided for acquisition or relocation projects undertaken before the community joined the Regular Phase of the National Flood Insurance Program (NFIP). No credit is provided for removing a building if another building has since been built on the same site, even if the new building was built to flood protection standards. A description of the kinds of buildings that can be counted toward bAR appears in Sections 301 through 303.

521 Credit Points

Maximum credit for Activity 520: 3,200 points.

a. Buildings acquired or relocated (bAR) (Maximum credit: 3,200 points)

bAR = the number of buildings acquired, relocated, or otherwise cleared from the regulatory floodplain since the effective date of the Flood Insurance Rate Map (FIRM). The regulatory floodplain is as shown on the Impact Adjustment Map discussed in Section 403. It may include areas outside of the SFHA.

To be counted toward bAR, an acquired or relocated building must meet these requirements:

1. It must be an insurable building (see Section 301);
2. It must have been acquired or relocated after the date of the community's initial Flood Insurance Rate Map (FIRM);
3. It must not have been replaced by another building on the floodprone portion of the same lot and the site will remain preserved as open space;
4. The lot must be plotted on the map discussed in Section 524.a; and
5. The building must have been located in the regulatory floodplain as shown on the Impact Adjustment Map prepared in accordance with Section 403.

If the community did not prepare an Impact Adjustment Map, credit is provided for buildings that were in the SFHA as shown on the community's current FIRM. If areas outside the SFHA are included in the community's regulatory program and credit is requested for buildings acquired or relocated in these areas, the community must demonstrate that these buildings were in areas currently under regulation.

A building that lies outside the regulatory floodplain (aRF) because of remapping, completion of a flood control structure, or other activity is not eligible for this credit. Such a building has already benefited twice: it does not have a mandatory NFIP insurance purchase requirement; and if the owner chooses to purchase NFIP insurance, the premium will be based on the lower X-Zone rate.

NOTE: See Section 505 on projects funded by the Flood Mitigation Assistance (FMA) program of the Department of Homeland Security's Federal Emergency Management Agency (FEMA).

b. Buildings on the repetitive loss list that have been acquired or relocated (bRL)

bRL = the number of buildings that are listed on FEMA's repetitive loss list that have been acquired, relocated, or otherwise removed from the flood problem site they occupied. If a repetitive loss property is also in the regulatory floodplain, it is counted under bRL, not under bAR.

c. Severe Repetitive Loss Properties that have been acquired or relocated (bSRL)

bSRL = the number of Severe Repetitive Loss Properties that have been acquired, relocated, or otherwise removed from the flood problem site they occupied. If a Severe Repetitive Loss Property is also in the SFHA, it is counted under bSRL, not under bAR. It is not double counted under bRL.

Section 501 explains the FEMA repetitive loss list. It is a list of properties that have received repetitive flood insurance claims. Communities with one or more properties on the list review the list as a prerequisite to entering the CRS.

Figure 500-1 explains Severe Repetitive Loss Properties, a subset of the repetitive loss properties that includes those that have been particularly hard hit by repetitive flooding and are prime candidates for acquisition or relocation.

bRL and bSRL credit those repetitive loss properties that have been acquired, relocated, or otherwise removed from the site where they suffered flooding. The buildings must meet the first four criteria for bAR noted above. They do not have to meet the fifth requirement, i.e., be located in the regulatory floodplain. To be credited toward bRL or bSRL, the building may be located anywhere in the community.

This element is verified by a review of the community's corrected repetitive loss list and field verified. A community with no properties on the FEMA repetitive loss list is not eligible for these credits.

Example 521.a-1. A check of building permit records since the community's initial FIRM date has shown that 12 homes in Floodville's regulatory floodplain were bought and cleared as part of a community development project. Four buildings were demolished to make way for a ballfield expansion. Two people have moved their homes to higher ground on their lots outside the SFHA and above the base flood elevation and the City purchased easements to keep the floodprone portions of the lots open. Six buildings were destroyed by flooding. The City purchased the six lots, two under FEMA's Section 1362 program.

Of these 24 buildings, six are on the repetitive loss list. One of the six is a Severe Repetitive Loss Property.

bAR = 18
bRL = 5
bSRL = 1

All 24 properties qualify for OS credit under Activity 420 (Open Space Preservation). Because the lots were small, the City opted to save some paperwork and not include all of them in its application for Activity 420. Only those properties that were added to Foster Creek Park were included in the application for Activity 420. However, the City can still document that the other properties meet the credit criteria for open space under Activity 420 as described in Section 421.a.

The City used a copy of the tax assessor's map to show the location of each of the 24 properties.

522 Impact Adjustment

a. Option 1

$c520 = (bAR \times 5) + (bRL \times 10) + (bSRL \times 15)$. Under Option 1, the maximum value for bAR, bRL or bSRL is 20. The maximum credit for c520 under Option 1 is 300.

If the community has acquired, relocated, or otherwise removed 20 or fewer buildings from its regulatory floodplain, then the Option 1 default credit calculation formula gives five points for each building. There is no impact adjustment formula under Option 1.

Where there is a mix of regular, repetitive loss, and Severe Repetitive Loss Properties, the score is calculated for each category. No more than 20 buildings can be counted under each category under Option 1.

Example 522.a-1. Bigtown has acquired and cleared 40 floodprone buildings:

- 25 buildings in the regulatory floodplain.
- 12 repetitive loss buildings, some in the SFHA and some out, and
- 3 Severe Repetitive Loss Properties, some in the SFHA and some out.

Bigtown has 2,000 buildings in the SFHA, so it uses Option 1. Because the maximum value for bAR is 20, it can only count 20 of the 25 buildings in the SFHA toward bAR.

$$\begin{aligned} c520 &= (bAR \times 5) + (bRL \times 10) + (bSRL \times 15) \\ &= (20 \times 5) + (12 \times 10) + (3 \times 15) = 100 + 120 + 45 = 265 \end{aligned}$$

b. Option 2:

bSF = the number of buildings in the SFHA.

$$rAR = \frac{100 \times (bAR + (2 \times bRL) + (3 \times bSRL))}{bSF + bAR + bRL + bSRL} \quad rAR \text{ cannot be greater than } 100.0.$$

Under Option 2, the credit points are based on the ratio of buildings that have been acquired or relocated from the regulatory floodplain (rAR). This is done by dividing the number of buildings acquired or relocated (including the multipliers for repetitive loss and Severe Repetitive Loss Properties) by the number of buildings in the SFHA before the projects were conducted (bSF plus the number of buildings removed). The numerator is multiplied by 100.

A detailed discussion of impact adjustment ratios based upon buildings can be found in Sections 302 and 303. The variable bSF is described in more detail in Section 303.

The denominator includes all existing buildings PLUS all buildings that have been acquired or relocated. The denominator does not change as more buildings are removed from the regulatory floodplain (i.e., the total of bSF + bAR + bRL + bSRL stays the same). However, rAR can decrease if more buildings are built in the floodplain (i.e., if bSF increases over time).

It should be noted that bAR buildings are in the regulatory floodplain (aRF) while bSF buildings are only in the SFHA as shown on the FIRM. If a community maps and regulates non-SFHA flood problem areas, it can also count buildings acquired or relocated from those areas towards bAR. This will result in a higher score.

Also, communities should note that if development is allowed in the SFHA, even if it is in compliance with the NFIP requirements, credit for this activity may decrease over time as the denominator increases.

Example 522.b-1. As discussed above for Floodville, bAR = 24, bRL = 5, and bSRL = 1. bSF is the total number of buildings currently in the SFHA. These include:

250 pre-FIRM buildings (bPR in Activity 310)
22 buildings built between the initial FIRM date and the CRS application date (bPO in Activity 310)
10 buildings built since the CRS application date (bEC in Activity 310)
282 buildings in the Special Flood Hazard Area (bSF)

$$\begin{aligned} rAR &= \frac{100 \times (bAR + (2 \times bRL) + (3 \times bSRL))}{bSF + bAR + bRL + bSRL} = \frac{100 \times (18 + (2 \times 5) + (3 \times 1))}{282 + 18 + 5 + 1} \\ &= \frac{100 \times (18 + 10 + 3)}{282 + 18 + 5 + 1} = \frac{100 \times 31}{306} = \frac{3,100}{306} = 10.13 \end{aligned}$$

523 Credit Calculation

- a. Option 1: $c520 = (bAR \times 5) + (bRL \times 10) + (bSRL \times 15)$
- b. Option 2: $c520 = 32 \times rAR$

A community may use whichever formula provides the larger score. If a community has acquired and relocated more than 20 buildings, it may still use Option 1 and apply for credit for only 20 of those buildings. A community may want to do this if this approach provides more points than Option 2 or if the staff does not want to or is unable to calculate the values for the variables in the formula. Under Option 1, the maximum value for bAR, bRL, or bSRL is 20. The maximum credit for c520 under Option 1 is 300.

Example 523-1. For Floodville:

$$c520 = 32 \times 10.13 = 324.16, \text{ which is rounded to } 324.$$

During the verification visit, the ISO/CRS Specialist reviewed the documentation for a sample of the buildings and found that they were all eligible for credit. She then visited the sites of a sample of the buildings to verify that there were no floodprone structures on them.

524 Credit Documentation

The community must have the following documentation available to verify implementation of this activity:

- a. A map showing the location of parcels where floodprone buildings have been demolished or relocated since the effective date of the FIRM and the total number of such buildings (bAR, bRL, and bSRL).

This map may be the same one used for documentation of open space credit under Section 424.d under Activity 420 (Open Space Preservation). It need only show the part of the community where buildings have been cleared. It should show lot boundaries. The map will be used by the ISO/CRS Specialist to check the sites during the verification visit.

- b. Documentation that shows that each site credited under this activity can also qualify for credit as preserved open space. This may be done by applying for Open Space (OS) credit under Activity 420 (Open Space Preservation) or by submitting the same documentation necessary for such credit as specified in Sections 424.a or 424.b.

As explained in Section 421.a, a site may be preserved as open space through public ownership or easement, ownership by a private preserve, or prohibitory development regulations. For acquisition and relocation credit, the community must demonstrate that the

site will remain vacant by showing that it also qualifies for credit under Activity 420 (Open Space Preservation).

- c. [If the community is using Option 2 under Section 522.b] Calculations showing the total number of buildings in the SFHA (bSF).

The variable bSF represents the number of buildings in the SFHA. It is discussed in detail in Sections 302 and 303.

- d. Real estate or permit records that document the date of removal of each building.

The community's building permit files should have records on relocation and demolition projects. This documentation is used to confirm that the building was removed after the effective date of the initial FIRM.

- e. [If the community is applying for credit for acquisition or relocation of non-repetitive loss buildings located outside the SFHA] Documentation that shows that floodplain regulations are in effect in the area outside the SFHA.

If the community's regulatory floodplain includes areas outside the SFHA shown on the FIRM, the community may request credit for acquisition or relocation of floodprone buildings outside the SFHA. However, the community must show that the areas outside the SFHA are subject to floodplain regulations. Often this documentation is supplied with the application for Activity 410 (Additional Flood Data). This documentation ensures that credit is given only for acquiring or relocating genuinely floodprone buildings.

525 For More Information

Additional information, reference materials, and examples can be found at the CRS Resource Center at <http://training.fema.gov/EMIWeb/CRS/>.

- a. Rural communities can request help on this activity from the Natural Resources Conservation Service. Requests should be submitted to the local soil and water conservation district, which is usually located in the county seat.
- b. The Corps of Engineers can provide technical information and advice to communities interested in relocation of buildings to flood-free sites. Requests for assistance should be addressed to the Flood Plain Management Services Coordinator at the appropriate District Office of the Corps.

- c. FEMA's Hazard Mitigation Grant Program and Flood Mitigation Assistance program are possible sources of financial assistance for acquiring and relocating floodprone properties. The State NFIP Coordinator or ISO/CRS Specialist should be contacted for the names of the people who run these programs. Additional programs are noted in Appendix F.
- d. Property Acquisition Handbook for Local Communities, FEMA 317, 1998, is a "how to" guide to help communities work through property acquisition. This handbook also contains a toolkit with tools and forms, including checklists, fact sheets, and briefing notes, to aid the process. It can be found at **<http://www.fema.gov/government/grant/resources/acqhandbook.shtm>**.

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530 FLOOD PROTECTION

Summary of Activity 530

531 Credit Points. Up to 2,800 points are provided. However, there is a maximum of 1,000 points for structural flood control projects and 200 for sewer backup protection projects.

- a. Prerequisites: Projects must protect to at least the 25-year flood level, in some cases be designed by an engineer, and meet other requirements specific to the type of project.
- b. Retrofitting technique used (TU): The points for TU are based on the effectiveness of:
 - Elevation,
 - Dry floodproofing,
 - Wet floodproofing, and
 - Protection from sewer backup.
- c. Flood control technique used (TU): The points for TU are based on the effectiveness of:
 - Barriers,
 - Channel modifications, including enlarging bridges and culverts,
 - Diversions,
 - Storm sewer improvements, and
 - Reservoirs and other storage basins that meet state dam safety requirements.
- d. Flood protection improvement (FPI): The points are adjusted based on the difference between the flood protection provided before and after the project.
- e. The values for TU and FPI for each building are multiplied and totaled to produce the score for protected buildings (PB)
- f. Protected buildings on the FEMA repetitive loss list are counted twice toward PB.
- g. Protected buildings in the floodplain that are critical facilities are counted twice toward PB.

532 Impact Adjustment. The credit points are adjusted in one of two ways.

- a. Under Option 1, the community receives 4.2 points for each protected building.
- b. Under Option 2, PB is divided by the number of buildings in the Special Flood Hazard Area.

533 Credit Calculation. The impact adjustment ratio is multiplied by 28.

534 Credit Documentation. The community must have the following available to verify implementation of this activity.

- a. Documentation that demonstrates that each project meets the prerequisites as described in Section 531.a.
- b. Documentation for each protected building, appropriate to the flood protection technique used.
- c. A map showing the location of all protected buildings for which credit is being requested.
- d. [If the community is using Option 2] Calculations showing the number of buildings in the SFHA.
- e. [If credit is being requested for buildings outside the SFHA] Documentation that shows that floodplain regulations are in effect in the area outside the SFHA.

535 For More Information.

530 FLOOD PROTECTION

Credit is provided for protecting buildings from flood damage through either of two methods:

- Retrofitting the buildings so that they suffer no or minimal damage when flooded.
- Constructing small flood control projects that keep flood waters from reaching the buildings or lower the level of flood waters.

Background: The 300 series of activities provides credit for encouraging retrofitting and other flood protection measures. This activity provides credit when properties are actually protected.

Acquisition and relocation of floodprone buildings is the preferred method of flood damage reduction. However, many buildings can be protected on-site, especially from shallow, slow-moving flood waters. This activity provides credits for those buildings left in the floodplain that have been protected from flood damage by retrofitting or certain types of flood control structures.

Activity Description: The credit is based on the number of insurable buildings in the area of regulated floodplain that have been retrofitted since the date of the community's original Flood Insurance Rate Map (FIRM). For the purposes of this activity, an accessory structure such as a garage or shed is not counted as an insurable building. Extra credit is given for protecting buildings on the repetitive loss list of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) (see Section 501).

Flood protection techniques that are recognized by this activity include:

Retrofitting projects:

- Elevating buildings above flood levels,
- Dry floodproofing,
- Wet floodproofing, and
- Protecting basements from sewer backup.

Structural flood control projects:

- Barriers, including levees, berms, and floodwalls;
- Channel modifications, including enlarging bridges and culverts;
- Diversions;
- Storm sewer improvements, including enclosing open channels; and
- Small reservoirs, including retention and detention basins.

The following techniques are NOT credited under this activity:

1. Projects that protect to less than the 25-year flood level;
2. Coastal structural projects, including seawalls, groins, and beach nourishment;

3. Levees or floodwalls that protect more than one property (such levees are covered under Activity 620 (Levee Safety));
4. Dams that do not meet dam safety requirements; and
5. Structural flood control projects owned AND operated by a federal agency.

Credit is not provided for the major flood control works owned and operated by agencies like the Corps of Engineers, Tennessee Valley Authority, and the Bureau of Reclamation. However, credit is provided for locally owned and operated projects that were partially funded by a federal agency.

6. Projects that protect buildings outside of the regulatory floodplain. There is no Community Rating System (CRS) credit for buildings (except repetitive loss buildings) that have been removed from the regulatory floodplain by a structural project.

If the community prepared an Impact Adjustment Map in accordance with Section 403 that shows floodprone areas subject to regulation outside of the Special Flood Hazard Area (SFHA), then buildings in the regulatory floodplain but outside the SFHA may be counted for this credit.

If the community did not prepare an Impact Adjustment Map, credit is provided for buildings in the SFHA shown on the current FIRM. If areas outside the SFHA are included in the community's regulatory program and credit is requested for protected buildings in these areas, the community must demonstrate that these buildings are in areas currently under regulation.

A building that lies outside the regulatory floodplain (aRF) because of remapping, completion of a flood control structure, or other activity is not eligible for this credit.

7. Projects implemented due to a requirement of the National Flood Insurance Program (NFIP), such as elevating a substantially damaged or substantially improved residential building. However, credit is provided for replacing a pre-FIRM building with a new or substantially improved post-FIRM building if the project was implemented voluntarily or pursuant to a community action, such as providing financial assistance or declaring a dilapidated structure to be unsafe and uninhabitable.

The NFIP requires that new, substantially improved, and substantially damaged residential buildings be elevated to or above the base flood level and that new, substantially improved, or substantially damaged non-residential buildings be elevated or dry floodproofed to or above the base flood level. Some items to note about these requirements are:

- The CRS credits other retrofitting measures, provided that the project is NOT part of a substantial improvement or a repair to a substantially damaged building.
- Credit is NOT provided for requiring new, substantially improved, or substantially damaged buildings to meet the minimum requirements of the NFIP.
- Similarly, if a community constructed a project to mitigate the adverse effect of not properly regulating new construction in accordance with a court order or an agreement with FEMA, then that action would be considered one taken to meet the minimum requirements of the NFIP and would not be credited.

The retrofitting techniques are described in more detail in the references listed at the end of this activity. The credit points are based on the effectiveness of the technique in preventing flood damage. The most effective techniques are elevation and those measures designed by a licensed engineer or architect.

Credit is also provided for certain structural flood control projects that reduce the flood hazard to a property. Structural flood control projects are also discussed in Activities 620 and 630 (Levee Safety and Dam Safety).

531 Credit Points

Maximum credit for Activity 530: 2,800 points. However, there is a maximum of 1,000 points for structural flood control projects and 200 for sewer backup protection projects.

Prerequisites:

a. 1. Each flood protection project must meet the following criteria:

- (a) All required permits must have been issued for the project or the local permit officer must state in writing that the project complies with all federal, state, and local codes and regulations.
- (b) The project must protect a building from at least the 25-year flood.
- (c) If the project requires human intervention, there must be at least one hour of flood warning time plus the time it takes to install the measure. "Human intervention" means that a person is needed at the site to close an opening or install or operate a protection device before floodwaters reach the building.
- (d) The project must have been completed after the effective date of the initial FIRM.

- (e) Credit is not provided for a retrofitted building or flood control project in disrepair or that otherwise does not appear to be maintained.
- 2. In addition to the above prerequisites, the design of retrofitting projects for buildings located in the following areas must be certified by a licensed professional engineer or architect:
 - (a) V Zones,
 - (b) Floodways with velocities greater than 5 feet per second, and
 - (c) Areas subject to any of the special hazards listed in Section 401.
- 3. In addition to the prerequisites in Section 531.a.1, structural flood control projects must meet the following prerequisites:
 - (a) The design and construction of the project must have been certified by a licensed professional engineer.
 - (b) The project must meet minimum environmental protection criteria.
 - (1) If the project was constructed on or after January 1, 1990, the community must document that all state and federal permits were obtained, including a Section 404 permit from the U.S. Army Corps of Engineers (or documentation that a 404 permit was not required).
 - (2) If the project was constructed before 1990, the community must document that the project would be approved if it went through an environmental review.
 - (3) If the project potentially affects a listed species or critical habitat under the Endangered Species Act and was constructed after the date of the listing of that species or designation of the critical habitat, the community must demonstrate compliance with Section 7 or 10 of the Act.

The environmental review standards are the standards currently used by the FEMA Regional Office to approve funding for flood control projects, such as drainage improvements. Each Regional Office can provide the community with its procedures for environmental reviews of new funding requests. The community can self-certify that the review criteria have been met.

Section 7 of the Endangered Species Act requires federal agency consultation with the U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS) if a project may have an impact on a listed species. If a federal agency funded the project or permitted the project under Section 404 of the Clean Water Act, there should be a completed consultation or some documentation by that agency that none was required.

Section 10 applies to the community and to individual developers. If the project has the potential to affect a species, the community or developer should have contacted NMFS or FWS to determine if an “incidental take” permit is required. If the project results in a “take” of the species, there should be an incidental take permit accompanied by a Habitat Conservation Plan to document this prerequisite.

- (c) The responsible agency must be implementing an operations and maintenance plan that was prepared for the project by a licensed professional engineer.
- (d) The community must be enforcing development regulations that prevent or minimize the impact of future development on the project’s flood protection level. These regulations can be either:
 - (1) Watershed-wide regulations that prevent increases in stormwater runoff. This can be documented by receipt of credit for stormwater management regulations under Activity 450 (Stormwater Management) (i.e., credit for SMR or SMP with an impact adjustment of 1.0). The design storm (DS) must be at least as large as the flood protection level for the project; or
 - (2) Regulations requiring new buildings in the regulatory floodplain to be protected to a base flood elevation based on a fully developed watershed. This can be documented by receipt of credit for either appropriate freeboard (FRB) under Activity 430 (Higher Regulatory Standards) or a flood study based on future conditions hydrology (ADS) under Activity 410 (Additional Flood Data).

These prerequisites assure FEMA that CRS credit is provided for projects that are properly designed and well maintained.

b. Retrofitting technique used (TU) (Maximum credit: 2,800 points)

TU_i = the value of TU for building i. The value of TU is based on the retrofitting technique used.

1. For elevated buildings:

TU = 1.0, if the building is elevated

2. For buildings that are dry floodproofed (i.e., the walls and floor are made watertight so floodwater does not enter the building):

<p>TU = 0.6, if the project was designed by a licensed engineer or architect and the design accounts for openings and internal drainage, seepage, and underdrainage.</p> <p>TU = 0.4, if the project does not depend on human intervention to close openings, the project protects to a level less than 3 feet over the first floor, the design accounts for internal drainage, seepage, and underdrainage, and the building does not have a basement (i.e., any floor below grade on all sides).</p> <p>TU = 0.2, for all other cases, including those for which there is no documentation of how openings, interior drainage, seepage, or underdrainage are handled.</p>
<p>3. For buildings that are wet floodproofed (i.e., floodwater is allowed into the building, but measures are taken to minimize damage):</p> <p>TU = 0.5, if the project was designed by a licensed engineer or architect.</p> <p>TU = 0.3, if the project was not designed by a licensed engineer or architect.</p> <p>TU = 0.2, if the furnace, water heater, electrical breaker box, and other utilities are relocated above flood level.</p>
<p>4. For buildings that are protected from sewer or sump backup:</p> <p>TU = 0.2, if the building is located in the SFHA.</p> <p>TU = 0.1, for sewer backup prevention measures if the building is located outside of the SFHA and the community has a building code or other regulations that require positive drain sewers or other measures that prevent sewer backup into new buildings. A maximum of 200 points is provided under this activity for sewer backup prevention measures outside of the SFHA.</p>

The variation in the value for the technique used (TU) is based on the reliability of the project to prevent flood damage. For example, dry floodproofing is a less reliable retrofitting approach than elevation. Other methods and variations on these methods can be submitted for review to determine the credit points.

The credit is calculated for each protected building. When calculating TU, each building is represented by the letter “i.” TU_i is the credit for the flood protection technique used to protect building “i.” When the formulae are completed on the activity worksheets, TU_1 and FPI_1 are the credits for building #1, TU_{24} and FPI_{24} are the credits for building #24, and so on.

Credit is usually not provided for post-FIRM buildings because the NFIP already requires that they be protected. However, if a post-FIRM building was retrofitted to protect it from a flood hazard not covered by the FIRM or NFIP regulations, credit is provided under this activity.

An example of this would be the case of a post-FIRM building constructed to the base flood elevation shown on an old FIRM. The current base flood elevation is higher because of a recent restudy. If the building is elevated again to protect against the new base flood elevation, then the community could receive retrofitting credit. However, constructing a NEW building to meet the community's flood protection requirements is not retrofitting.

c. Structural flood control technique used (TU) (Maximum credit: 1,000 points)

TU_i = the value of TU for building i. The value of TU is based on the structural flood control technique used. If more than one technique is used to protect a building, then TU = the lower of the techniques' values.

1. For buildings protected by a barrier, including a levee, berm, or floodwall, the following prerequisites must be met in addition to those in Section 531.a:
 - (a) The barrier must be located entirely on the property of the owner of the protected building(s).

The reason for this requirement is to ensure that those who are protected will maintain the levee or floodwall. When a barrier protects several neighbors and one neglects maintenance, all the properties are in jeopardy.

A barrier entirely on property owned by a condominium association would be acceptable, while one on property owned by a homeowner's association that protects several privately owned homes would not. If the barrier is on land that does not meet this requirement, then the community should review the credit criteria in Activity 620 (Levee Safety) to see if it would qualify for that credit.

- (b) The barrier must have no openings (e.g., access is gained by going over the wall), openings that close without human intervention, or a written plan and adequate warning time for available personnel to close the openings.

TU = 0.8, if the barrier was designed, and the construction approved, by a licensed engineer and the design accounts for interior drainage, seepage, and underdrainage.

TU = 0.4, if the barrier was not designed by a licensed engineer, but the design accounts for interior drainage, seepage, and underdrainage.

2. For buildings protected by a channel modification project, including diversions, enlarging bridges and culverts, and storm sewer improvements, a licensed professional engineer must certify that no buildings are located in areas that would be impacted by any increases in flood elevations caused by the project.

$TU = 0.8$, if the project design provides at least one foot of clearance between the flood protection level and bridge decks, top of pipe, and other obstructions.

$TU = 0.7$, in all other cases.

3. For buildings protected by a reservoir, detention basin, retention pond, or other flood water storage facility

$TU = 0.8$

If the flood water is stored behind a dam or other above-ground containment structure, then the community must document that the structure meets all state dam safety requirements. If the state does not have a dam safety program, then a licensed professional engineer must certify that the structure meets the U.S. Army Corps of Engineers' dam safety criteria.

d. Flood protection improvement (FPI)

FPI_i = the improved flood protection that the project provides for building i

1. For buildings that have been elevated so they meet the NFIP requirements for new construction:

$FPI_i = 1.0$, if the building (and its utilities, duct work, etc.) have been elevated to one foot or more above the base flood elevation.

$FPI_i = 0.9$, if the building (and its utilities, duct work, etc.) have been elevated to or above the base flood elevation.

2. The credit for all other flood protection measures is adjusted for the flood protection improvement provided to each building:

$FPI_i = FPP_i - FPB_i$, where

FPI_i = flood protection improvement for building i

FPP = flood protection provided by the project

FPB = flood protection level before the project was constructed.

3. The values for FPP and FPB are:

0.0 for protection to less than the 10-year flood

0.3 for protection to the 10-year flood, but less than the 25-year flood

0.5 for protection to the 25-year flood, but less than the 50-year flood

0.8 for protection to the 50-year flood, but less than the 100-year flood

0.9 for protection to the 100-year flood

1.0 for protection to the 100-year flood plus one foot or more

1.0 for protection to the 500-year flood

4. The minimum value for FPP is 0.5. There is no credit for flood protection measures that protect to less than the 25-year flood level.
5. The flood protection level of a barrier is the top of the barrier.
6. If a basement is protected from sewer backup by an overhead sewer or backup valve, then $FPP = 1.0$

If a structural flood control project modifies the 100-year floodplain, the community is obligated to notify FEMA of the changes (44 *CFR* 65.3).

Example 531-1.

Example 1: A building on a crawlspace was elevated from the 10-year flood elevation to one foot above 100-year flood elevation.

$$FPI = 1.0$$

Example 2: A building has been protected by a 25-year berm (changing its protection level from 0 to the 25-year flood level).

$$FPP = 0.5, FPB = 0, FPI = FPP - FPB = 0.5 - 0 = 0.5$$

Example 3: A channel improvement lowers the 100-year flood by 2 feet. Instead of having the 50-year flood go over the lowest floor, buildings are now dry during the 100-year flood. For these buildings:

$$FPP = 0.9, FPB = 0.8,$$

$$FPI = FPP - FPB = 0.9 - 0.8 = 0.1$$

Example 4: Another building closer to the stream is affected by the same channel improvement. The two-foot drop in flood levels means that this building is now subject only to the 60-year flood instead of the 35-year flood.

$$FPP = 0.8, FPB = 0.5, FPI = FPP - FPB = 0.8 - 0.5 = 0.3$$

e. Protected buildings

$PB = \sum(TU_i \times FPI_i)$. That is, PB, the variable for protected buildings, is the sum of the TU value for each building times the FPI value for that building. The maximum value for $(TU_i \times FPI_i)$ for any single building is 1.0 (i.e., the building was elevated ($TU_i = 1.0$) and it was elevated to one foot above the base flood level ($FPI_i = 1.0$)).

Summing the factors for each building is shown in the formula with the mathematical symbol “ Σ ” (sigma). The calculations are easier to understand and compute in the activity worksheets.

NOTE: See Section 505 on projects funded by FEMA's Flood Mitigation Assistance program.

- f. If a protected building in the regulatory floodplain is also on the FEMA repetitive loss list, it is counted twice toward PB. If a protected building outside of the regulatory floodplain is also on the FEMA repetitive loss list, it is counted once toward PB.

If a protected building is a Severe Repetitive Loss Property and in the regulatory floodplain, it is counted three times toward PB. If a protected building outside of the regulatory floodplain is also a Severe Repetitive Loss Property, it is counted twice toward PB. These multipliers are provided only if the flood protection measure was sufficient to remove the property from the repetitive loss list.

Section 501 explains the FEMA repetitive loss list. It is a list of properties that have received repetitive flood insurance claims. Communities with one or more properties on the list review the list as a prerequisite to entering the CRS.

Figure 500-1 explains Severe Repetitive Loss Properties, a subset of the repetitive loss properties that includes those that have been particularly hard hit by repetitive flooding and are prime candidates for flood protection. Additional credit is provided for each Severe Repetitive Loss Property that has been protected. For example, if five floodplain properties on the repetitive loss list were elevated and one was a Severe Repetitive Loss Property, then they would be counted as $(4 \times 2) + (1 \times 3) = 11$ buildings counted toward PB.

If a repetitive loss property in the regulatory floodplain, it is simply listed twice on the activity worksheet, AW-530-2, and noted as "repetitive loss." If it is not in the community's regulatory floodplain, it is listed once. The same approach is used for Severe Repetitive Loss Properties, except that if one is in the regulatory floodplain, it is listed three times (twice if it is outside the floodplain).

No separate documentation is needed for this extra repetitive loss credit. It is verified by a review of the community's corrected repetitive loss list and field verified with the other buildings credited for PB. A community with no properties on the FEMA repetitive loss list is not eligible for this extra credit.

Example 531-2. A review of Floodville's building permits identified 5 retrofitted buildings. They are listed by address and numbered on AW-530-2. Buildings 1–4 are in or near Area #1 in Figure 500-1. Because Area #1 is subject to ice jams, it is a high hazard area. The retrofitting projects were all designed by a licensed engineer.

Buildings 1 and 2 were elevated several years ago. The buildings were subject to damage by the 10-year flood until they were raised above the level of an earlier flood, which was about a 50-year event. (The projects were not substantial improvements, so there was no code requirement to go to the 100-year flood level).

$$TU_{1-2} = 1.0$$

$$FPP_{1-2} = 0.8, FPB_{1-2} = 0$$

$$FPI_{1-2} = FPP_{1-2} - FPB_{1-2} = 0.8 - 0 = 0.8$$

$$TU_{1-2} \times FPI_{1-2} = 1.0 \times 0.8 = 0.8$$

Buildings 3 and 4 were elevated after the last flood. They were not as low as buildings 1 and 2. It is estimated that they were at a 10–20-year flood level. The City used FEMA Hazard Mitigation Grant funds to encourage voluntary retrofitting. Buildings 3 and 4 were elevated 2 feet above the base flood level.

$$TU_{3-4} = 1.0$$

$$FPI_{3-4} = 1.0$$

$$TU_{3-4} \times FPI_{3-4} = 1.0 \times 1.0 = 1.0$$

Building 1 and Building 3 are on FEMA's repetitive loss list, so they are listed twice on AW-530-2.

Buildings 5–14 are in or near Area #2. Although Area #2 is outside the SFHA, it is subject to Floodville's floodplain regulations. Buildings in this floodplain are therefore eligible for credit under this activity. The area flooded an average of every 5 years, so the buildings are considered to have been protected to less than the 10-year flood level

Buildings 5–14 benefited from a culvert enlargement. The City had surveyed each building in this area. The channel and the culvert can now handle the 25-year flood without its reaching these buildings. The other buildings in this floodplain, closer to the channel, are still subject to flooding by the 25-year flood.

$$TU_{5-14} = 0.7$$

$$FPP_{5-14} = 0.5, FPB_{5-14} = 0$$

$$FPI_{5-14} = FPP_{5-14} - FPB_{5-14} = 0.5 - 0 = 0.5$$

$$TU_{5-14} \times FPI_{5-14} = 0.7 \times 0.5 = 0.35$$

Buildings 8, 13 and 14 are on FEMA's repetitive loss list, so they are listed twice on AW-530-2.

The calculations are done on AW-530-2. PB = 9.95.

g. If a protected building in the regulatory floodplain is also a critical facility, it is counted twice toward PB. If a protected building outside of the regulatory floodplain is also a critical facility, it is counted once toward PB.

For CRS credit purposes, critical facilities are defined in Section 130. This section provides a bonus for protecting structures such as emergency operations centers, hospitals, and buildings where hazardous materials are stored. Like repetitive loss buildings, buildings that are critical facilities are scored twice.

532 Impact Adjustment

a. Option 1:

$rPB = 0.15 \times$ the number of buildings protected using one or more of the techniques described in Section 531.b or c. The projects must meet all of the prerequisites in Section 531, including protecting to at least the 25-year flood level. A maximum of 20 different properties can be counted toward Option 1. This can be any combination of properties in the regulatory floodplain, repetitive loss buildings, and Severe Repetitive Loss Properties.

If the community uses Option 1, it will receive 4.2 points for each protected building. The maximum value under Option 1 is limited to the scores for 20 different properties. For example, the community may count 14 buildings removed from the regulatory floodplain, 5 repetitive loss properties, and 1 Severe Repetitive Loss Property. Using the repetitive loss multipliers in Section 531.e, these 20 properties equate to $14 + (5 \times 2) + (1 \times 3) = 27$ protected buildings. $rPB = 0.15 \times 27 = 4.05$.

The community does not need to complete activity worksheet AW-530-2, nor does its application specify the addresses or the values for TU and FPI for the protected buildings. However, the community must still have this information available for the credited buildings during the verification visit and it must be able to show that the retrofitting or structural flood control projects meet all of the relevant prerequisites.

b. Option 2:

bSF = the number of buildings in the SFHA, as described in Section 303.

$rPB = \frac{100 \times PB}{bSF}$. rPB cannot be greater than 100.0.

The credit points for this activity are based on the ratio of the protected buildings' points (rPB) to the number of buildings in the SFHA. This is done by dividing the points for protected buildings (PB) by the number of buildings in the SFHA (bSF). bSF is the same variable used in Activities 520, 610, and 620, and is described in more detail in Sections 302–303. Even if the community is requesting credit for buildings outside the SFHA, the impact adjustment is based on bSF , the number of buildings in the SFHA.

It is theoretically possible that there are more protected buildings than buildings in the SFHA and that the number of retrofitted buildings could be greater than bSF. However, rPB cannot be greater than 100.0. Note that buildings not on FEMA's repetitive loss list that are outside of the SFHA can only be counted toward PB if they are in an area subject to floodplain regulations (aRF) as shown on the community's Impact Adjustment Map (see Section 403).

Example 532.b-1. Someburg has protected ten buildings from the 50-year flood with a channel improvement, has two buildings elevated above the 100-year flood level, and has constructed a barrier around the public works garage to protect it from the 25-year flood. Someburg has 13 buildings that are protected by techniques that meet the criteria of Section 531.b or c. The Someburg building official has permit records for each project. None of the projects requires human intervention, nor are the buildings located in a high hazard area.

Under Option 1, $rPB = 0.15 \times 13 = 1.95$

Example 532.b-2. As noted in the previous section, Floodville's PB score is 9.95. As noted in Section 522, there are 282 buildings in Floodville's SFHA: bSF = 282.

Under Option 2, $rPB = \frac{100 \times 9.95}{282} = \frac{995}{282} = 3.53$

533 Credit Calculation

$$c530 = 28 \times rPB$$

Example 533-1. Someburg uses Option 1 for the impact adjustment:

$$rPB = 1.95$$

$$c530 = 28 \times 1.95 = 54.6, \text{ rounded to } 55$$

Example 533-2. Floodville receives more credit points using Option 2. As discussed above, rPB for Floodville is 3.53.

$$c530 = 28 \times 3.53 = 98.84, \text{ rounded to } 99$$

Example 533-3. Bigtown constructs a series of flood control reservoirs and detention basins to reduce flood levels on Swampy Creek. Some wetlands are preserved and some more are created to act as natural retention areas. There are

600 buildings in Bigtown's regulatory floodplain. This project protects 400 that had been flooded twice in the last 20 years from the 75-year flood.

$$TU_{1-400} = 0.8$$

$$FPP_{1-400} = 0.8, FPB_{1-400} = 0.3$$

$$FPI_{1-400} = FPP_{1-400} - FPB_{1-400} = 0.8 - 0.3 = 0.5$$

$$TU_{1-400} \times FPI_{1-400} = 0.8 \times 0.5 = 0.4$$

$$PB = 400 \times 0.4 = 160$$

Using Option 2: $bSF = 600$

$$rPB = \frac{100 \times 160}{600} = 26.67$$

$$c530 = 28 \times 26.67 = 746.76, \text{ rounded to } 747$$

534 Credit Documentation

The community must have the following documentation available to verify implementation of this activity:

a. Documentation that demonstrates that each project meets the prerequisites as described in Section 531.a:

1. For all projects:

(a) All required permits were obtained or the local permit official states in writing that the project complies with all federal, state, and local codes and regulations.

(b) Protection is provided to at least the 25-year flood level.

(c) If human intervention is required, there is at least one hour of warning time.

(d) The project was completed after the effective date of the initial FIRM.

(e) The building or project is in good condition.

2. For retrofitting projects: If the building is in a high hazard area, the design was certified by a licensed professional engineer or architect.

3. For structural flood control projects:

(a) The design and construction were certified by a licensed professional engineer.

- (b) The project meets the minimum environmental protection criteria.
- (c) The responsible agency is implementing an operations and maintenance plan that was prepared for the project by a licensed professional engineer.
- (d) The community is enforcing development regulations that prevent or minimize the impact of future development on the project's flood protection level.

These prerequisites are discussed in Section 531.a. For some items, the documentation would be a copy of the permit, project plan, or ordinance. In other cases, a local official may have to certify that a prerequisite has been met.

- b. Documentation for each protected building that is appropriate to the type of flood protection technique used.
 - 1. For retrofitting projects:
 - (a) For elevated buildings, a elevation certificate should be provided.
 - (b) For retrofitting projects other than elevation, AW-530-3 and AW-530-4 are optional forms that may be used.
 - (c) If the retrofitting project was a substantial improvement or was made to a substantially damaged building, the documentation must also show that the project was implemented pursuant to a community action other than routine enforcement of the NFIP requirements, such as providing financial assistance or declaring a dilapidated structure to be unsafe and uninhabitable.

Examples of AW-530-3 and AW-530-4 appear in Figures 530-1a and 530-1b.

Credit is not provided for requiring new, substantially improved, or substantially damaged buildings to meet the minimum requirements of the NFIP. However, credit is provided if a community action causes a pre-FIRM building to be brought up to post-FIRM standards.

- 2. The documentation for structural flood control projects must show:
 - (a) The level of flood protection for each building to be credited, both before and after the project was installed or constructed.

- (b) [For buildings protected by a reservoir, detention basin, retention pond, or other facility that stores water above ground] That the structure meets all state dam safety requirements. This is done with a letter from the state dam safety office. If there is no state dam safety office, then a licensed professional engineer must certify that the project meets all appropriate dam safety criteria.

There must be documentation on each building. A channel modification or reservoir that lowers the 25-year flood level of the stream may still leave many buildings exposed to flooding by the 25-year flood.

- c. A map showing the location of all protected buildings for which credit is being requested.
1. If the building is on FEMA's repetitive loss list (including being a Severe Repetitive Loss Property), it may be located anywhere in the community.
 2. If the building is not on FEMA's repetitive loss list, it must be located in the SFHA as shown on the FIRM or in the regulatory floodplain as shown on the Impact Adjustment Map prepared in accordance with Section 403.

This map is not necessarily the same as the Impact Adjustment Map prepared pursuant to Section 403. It need only show the part of the community in which buildings have been protected. The map for this activity does not need to show lot boundaries, unless the same map is used for Activity 520 (Acquisition and Relocation).

- d. [If the community is using Option 2 under Section 532.b] Calculations showing the total number of buildings in the SFHA (bSF).

NOTE: The variable *bSF* must have the same value as *bSF* in Activities 520, 610, and 620.

- e. [If the community is applying for credit for protecting non-repetitive loss buildings located outside the SFHA] Documentation that shows that floodplain regulations are in effect in the area outside the SFHA.

As noted in Section 524.e, this documentation requirement ensures that CRS credit is provided only for actions taken to mitigate damage to genuinely floodprone properties.

535 For More Information

Additional information, reference materials, and examples can be found at the CRS Resource Center at <http://training.fema.gov/EMIWeb/CRS/>.

a. Copies of the following publications are available free from

FEMA Distribution Center
P.O. Box 2010
Jessup, MD 20794-2012
800-480-2520
Fax: (301) 362-5335

1. Comprehensive and detailed reviews of retrofitting:

Above the Flood: Elevating Your Floodprone House, FEMA-347, 2000.

<http://www.fema.gov/library/viewRecord.do?id=1424>.

Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding, FEMA-312, 1998.

<http://www.fema.gov/hazard/flood/pubs/lib312.shtm>

Design Manual for Retrofitting Flood-prone Residential Structures, FEMA-114, 1986.

<http://www.fema.gov/library/viewRecord.do?id=1414>

Engineering Principles and Practices for Retrofitting Flood Prone Residential Buildings, FEMA-259, 1995.

<http://www.fema.gov/hazard/flood/pubs/lib259.shtm>

2. Additional references on elevating a building:

Elevated Residential Structures, FEMA-54, 1984.

<http://www.fema.gov/hazard/flood/pubs/lib54.shtm>

Coastal Construction Manual, FEMA-55, Third Edition, 2000.

<http://www.fema.gov/hazard/flood/pubs/lib55.shtm>

Mitigation of Flood and Erosion Damage to Residential Buildings in Coastal Areas, FEMA-257, October 1994.

<http://www.fema.gov/library/viewRecord.do?id=1643>

Manufactured Home Installation in Flood Hazard Areas, FEMA-85, 1985.

<http://www.fema.gov/hazard/flood/pubs/lib85.shtm>

Openings in Foundation Walls, FIA-TB-1, 1993.

<http://www.fema.gov/library/viewRecord.do?id=1579>

Free-of-Obstruction Requirements, FIA-TB-5, 1993.

<http://www.fema.gov/library/viewRecord.do?id=1718>

Below-Grade Parking Requirements, FIA-TB-6, 1993.

<http://www.fema.gov/library/viewRecord.do?id=1719>

3. Additional references on wet and dry floodproofing:

Floodproofing Nonresidential Structures, FEMA-102, 1986.
<http://www.fema.gov/library/viewRecord.do?id=1413>

Flood-Resistant Materials Requirements, FIA-TB-2, 1993.
<http://www.fema.gov/library/viewRecord.do?id=1580>

Non-Residential Floodproofing—Requirements and Certification, FIA-TB-3, 1993.
<http://www.fema.gov/library/viewRecord.do?id=1716>

Protecting Building Utilities From Flood Damage, FEMA-348, 2000.
<http://www.fema.gov/hazard/flood/pubs/pbuffd.shtm>

Wet Floodproofing Requirements, FIA-TB-7, 1993.
<http://www.fema.gov/library/viewRecord.do?id=1720>

4. Additional references on protecting critical facilities:

Design Guide for Improving Critical Facility Safety from Flooding and High Winds, FEMA 543, 2007. <http://www.fema.gov/library/viewRecord.do?id=2441>.

b. These Corps floodproofing publications can be found on the following website:

<https://www.nwo.usace.army.mil/nfpc/publications.html>

Hard copies can be ordered from

U.S. Army Corps of Engineers, CECW-PD
 National Nonstructural/Flood Proofing Committee
 Attn: Joe Remondini
 1645 South 101st East Avenue
 Tulsa, Oklahoma 74128
 (918) 669-7197

1. Overviews of retrofitting issues:

Flood Proofing Techniques, Programs and References, 1991.

Flood Proofing: How to Evaluate Your Options, 1993.

Local Flood Proofing Programs, 2005.

Flood Proofing Performance—Successes & Failures, 1998

2. Additional references on elevating a building:

Raising and Moving The Slab-On-Grade House, 1990.

A Flood Proofing Success Story, September 1993.

Flood Proofing Technology in the Tug Fork Valley, 1994.

3. Additional references on wet and dry floodproofing:

Flood Proofing Systems & Techniques, 1984.

Flood-Proofing Regulations, EP 1165 3 314, 1995.

- c. The U.S. Army Corps of Engineers can provide technical information and advice on retrofitting techniques to interested communities and individuals. Requests for assistance should be submitted to the Flood Plain Management Services Coordinator at the appropriate District Office of the Corps.
- d. Rural communities can request help on this activity from the Natural Resources Conservation Service. Requests should be submitted to the local soil and water conservation district, which is usually located in the county seat.
- e. Several states have published their own floodproofing or retrofitting manuals and some have programs to help fund or otherwise assist property owners.
- f. The Emergency Management Institute (EMI) is a FEMA training center located in Emmitsburg, Maryland. It offers a five-day course on retrofitting techniques oriented to engineers and experienced building professionals. Stipends to cover travel, registration, and rooms are usually available from FEMA. Information is available from EMI at 1-800-238-3358 or the state emergency management agency's training office.
- g. The following sites provide information on retrofitting:
 - <http://www.fema.gov/rebuild/mat/fema312.shtm>
 - <https://www.nwo.usace.army.mil/nfpc/index.html>
 - <http://www.LouisianaFloods.org>
- h. More information on sources of funding for flood protection projects can be found in Section 504, Appendix F, and the following publications:
 - Reducing Damage from Localized Flooding: A Guide for Communities*, FEMA 511, 2005, available at <http://www.fema.gov/library/viewRecord.do?id=1448>.
 - Local Flood Proofing Programs*, U.S. Army Corps of Engineers, 2005, available at https://www.nwo.usace.army.mil/nfpc/docs/Local_FP_Programs_February_2005.pdf.

Community : Anytown

RETROFITTING WORKSHEET

This is an optional form that may be used to record CRS credit criteria for retrofitting projects that are not in a high hazard area and that do not need to be designed or approved by an engineer or architect. Elevated buildings should be documented with a FEMA elevation certificate.

Property Address: 123 Memory Lane
Anytown

Permit record. EITHER Permit # 02-32 Date of Permit: 6/3/02
OR

☐ The project meets all requirements of the regulations currently in effect.

☐ The project was completed after the effective date of the initial FIRM.

Building/project condition.

☒ The building or project appears to be maintained.

Human intervention. EITHER:

☒ The project does not require human intervention. OR

☐ The project requires human intervention and there is adequate warning time.

Approximate duration of flood events: _____ hours/days.

High hazard area. EITHER:

☒ The building is NOT located in a V Zone, floodway with velocity > 5 feet per second, or an area subject to special hazard. OR

☐ The building is located in one of the high hazard areas and the design was certified by a licensed professional engineer or architect.

Dry floodproofing.

☐ The project was designed by an engineer and the design accounts for interior drainage, seepage, and underdrainage. (TU = 0.6)

☒ The project does not depend on human intervention to close openings; the project protects to a level less than 3 feet over the first floor; the design accounts for internal drainage, seepage, and underdrainage; and the building does not have a basement. (TU = 0.4)

☐ There is no documentation of how openings, internal drainage, seepage, or underdrainage are handled. (TU = 0.2)

Figure 530-1a. Example worksheet for documenting a retrofitting project (AW-530-3).

Community: Anytown

Wet floodproofing.

☐ The project was designed by a licensed engineer or architect. (TU = 0.5)

☐ The project was not designed by a licensed engineer or architect. (TU = 0.3)

☐ The furnace, water heater, electrical breaker box, and other utilities are relocated above flood level. (TU = 0.2)

Sewer backup protection.

☐ The building is located in the SFHA. (TU = 0.2)

☐ The building is located outside of the SFHA and the community has a building code or other regulations that require positive drain sewers or other measures that prevent sewer backup into new buildings. (TU = 0.1)

Flood protection improvement (FPI).

Before the retrofitting project, the building was protected from the 40-year flood FPB = 0.0

After the retrofitting project, the building was protected from the 50-year flood FPP = 0.8

The values for FPB and FPP are:

- 0.0 for protection to less than the 10-year flood
- 0.3 for protection to the 10-year flood, but less than the 25-year flood
- 0.5 for protection to the 25-year flood, but less than the 50-year flood
- 0.8 for protection to the 50-year flood, but less than the 100-year flood
- 0.9 for protection to the 100-year flood
- 1.0 for protection to the 100-year plus one foot or more
- 1.0 for protection to the 500-year flood

Source of flood recurrence interval if other than FIS: _____

CRS scores: TU = 0.4 FPB = 0.0 FPP = 0.8

☒ This property is on the FEMA repetitive loss list.

☐ This property is on the FEMA Severe Repetitive Loss list.

I certify that the items checked above are correct to the best of my knowledge.

Name (signed): Bill D. Best

Name (printed): Bill D. Best Date: 7/12/05

Activity Worksheet AW-530-4 Edition: 2006
2006

Figure 530-1b. Page two of an example worksheet for documenting a retrofitting project (AW-530-4).

540 DRAINAGE SYSTEM MAINTENANCE

Summary of Activity 540

541 Credit Points. There are three elements in this activity for a maximum of 330 points (excluding special hazard credit).

- a. Channel and basin debris removal (CDR): Up to 300 points are provided for inspecting the drainage system and removing debris. For the purposes of this activity, a community's drainage system consists of all natural and human-made watercourses, conduits, and storage basins that must be maintained to prevent flood damage to buildings from smaller, more frequent storms.
- b. Steam dumping regulations (SDR): Up to 30 points are provided if the community has regulations prohibiting dumping in streams and ditches.
- c. Coastal erosion protection maintenance (EPM): Credit points are provided for maintaining erosion protection programs in communities with coastal erosion-prone areas as described in *CRS Credit for Management of Coastal Erosion Hazards*.

542 Impact Adjustment. The credit points for each element are adjusted in one of three ways.

- a. Under Option 1, if the program is implemented throughout the community, the impact adjustment ratio for an element is 1.0.
- b. Under Option 2, if the program is not implemented throughout all of the developed portions of the community, a default impact adjustment ratio of 0.2 may be used.
- c. Under Option 3, if the program is not implemented throughout all of the developed portions of the community, the impact adjustment ratios may reflect the proportion of the community's drainage system that is affected.

543 Credit Calculation. The credit points for each element are multiplied by the impact adjustment ratios and their products are totaled.

544 Credit Documentation. The community must have the following available to verify implementation of this activity.

- a. A description of the drainage system and areas subject to the maintenance program, an explanation of the inspection and debris removal procedures, and records to document both the inspection and removal projects.
- b. [Required if the community is applying for credit under Section 541.a.3] A copy or description of the capital improvements program, including
 1. A master list of the community's drainage maintenance problem sites,
 2. Recommended corrective measures for each problem site, and
 3. Documentation that funds are spent on improvement projects each year.
- c. [Required if applying for credit for SDR under Section 541.b] A copy of the stream dumping ordinance or pertinent portion of the law.
- d. [Required if applying for SDR under Section 541.b.2] A photo or photocopy of the "no dumping" sign OR a copy of the outreach project OR a note that the outreach project documentation is included in the documentation submitted for Activity 330 (Outreach Projects).
- e. [If the community determines the impact adjustment factors using Options 1 or 3 (Sections 542.a and 542.c)] An Impact Adjustment Map that shows all channels and other drainage facilities in the developed portion of the community and identifies the channels and facilities covered by the channel and basin debris removal program.
- f. Documentation demonstrating that the inspection and maintenance were performed according to the procedures submitted in Section 544.a.

545 For More Information.

540 DRAINAGE SYSTEM MAINTENANCE

***NOTE:** A separate publication, **CRS Credit for Drainage System Maintenance**, provides an example of a community program and application documentation. Communities are encouraged to obtain and read this document before applying for this activity. It will improve the quality of the application and reduce the need to provide additional documentation later. To order a free copy, see Appendix E.*

Credit is provided for keeping the channels and retention basins of a community's drainage system clear of debris in order to maintain its flood carrying and storage capacity.

Background: An area's drainage system consists of natural drainageways or channels, human-made storm sewers and ditches, and detention/retention basins built along the system to store high flows. In many cases, the actual channel of a natural stream will carry only the two-year flood, with the larger flows being carried in the overbank area. Engineered channels are designed to carry larger floods. When a drainage system loses a portion of its carrying or storage capacity, overbank flooding occurs more frequently and flows reach higher elevations.

Even where floodplain regulations prevent construction from encroaching, channels and detention basins can lose their carrying capacities due to debris accumulation, sedimentation, and the growth of vegetation.

One proven approach to preventing this is a community program to routinely inspect and clear debris from the drainage system. This work can be limited to cleaning out culverts and removing trash, shopping carts, and similar debris that can dam a stream and cause flooding, even during small storms.

Activity Description: Under this activity, a community receives credit for inspecting its drainage system, removing debris, and correcting drainage problem sites. For the purposes of this activity, a community's drainage system consists of all natural and human-made watercourses, conduits, and storage basins that must be maintained in order to prevent flood damage to buildings from smaller, more frequent storms. In some communities, this will include streets, roadside ditches, underground storm sewers, and inlets, as well as open channels and detention and retention basins.

The sites of flood insurance and disaster assistance claims should be considered by the community in determining the extent of the local drainage system that deserves regular maintenance. In communities with repetitive losses (Category B and C communities), the drainage system **MUST** cover those areas having repetitive loss properties where the cause of the losses was due to local drainage problems or smaller, more frequent storms.

If the community does not inspect and maintain all parts of its drainage system, either because it does not have legal access to those parts on private property or for some other reason, it must use the impact adjustment to reflect the portion that it does maintain.

Each community must define its own drainage system for this activity. This is best done on a map with a narrative that is included in the drainage system maintenance procedures submitted with the CRS application (see Section 544.a.2).

The definition is based on what needs to be maintained in order to prevent damage to buildings. In some communities, the drainage system will be open channels and ditches. In a flat community, especially one protected by a levee, maintaining storm sewers, sewer inlets, and human-made canals may be vital to prevent flooding. In some areas of a community, roadside ditches are important conveyors of surface water and must be kept cleaned.

The map should be prepared in three stages:

1. Show which parts of the community are developed. This activity is not concerned with drainageways through parks, farms, and undeveloped areas if insurable buildings will not be affected due to a lack of maintenance. However, this activity encourages maintenance of all undeveloped areas that should be maintained for any reason (e.g., to keep a road from flooding).
2. Identify the drainage system in the developed areas, i.e., all rivers, creeks, natural streams, open channels, ditches and storage basins and those parts of the underground system that need to be maintained to prevent flooding of buildings. This must include all channels and basins in developed Special Flood Hazard Areas (SFHAs) shown on the community's Flood Insurance Rate Map (FIRM).
3. Show which parts of the developed areas are covered by the inspection and maintenance program. This may exclude parts of the drainage system that are on private property where the community has no right of access or it may exclude parts that the community simply does not cover for budgetary or other reasons.

Defining and mapping the drainage system for this activity is explained in more detail in *CRS Credit for Drainage System Maintenance*.

Communities must be aware of all environmental laws and regulations that affect their ability to conduct maintenance operations, including the Endangered Species Act of 1973. Credit will not be approved for any procedures that are not consistent with those requirements.

The implementing agency need not be the community. Many communities are in flood control or drainage districts that perform this work. However, no credit is provided for projects that rely on unsecured outside funding, such as a special appropriation from the state legislature or approval of a Corps of Engineers clearing and snagging project. Secure outside funding, such as an annual state distribution of gasoline tax receipts, is acceptable.

NOTE: *The NFIP requires that communities “must assure the carrying capacity within the altered or relocated portion of any watercourse is maintained” (44 CFR 60.3(b)(7)). This maintenance provision applies to any watercourse altered or relocated after the date of adoption of the community’s floodplain management ordinance. Any natural growth or human-made debris that reduces the carrying capacity of these channels may be a violation of that ordinance. In addition, these areas may be remapped by the Department of Homeland Security’s Federal Emergency Management Agency (FEMA) to reflect the current carrying capacity and potential increased risk to existing development.*

This activity also credits regulations against dumping in the drainage system. Credit is available under Activity 330 (Outreach Projects) for advising people about the regulations and the need for open channels and cleared basins.

541 Credit Points

Maximum credit for Activity 540: 330 points

a. Channel and basin debris removal (CDR) (Maximum credit: 300 points)

CDR = the total of the following points, except that no credit is provided unless the first item is credited.

1. 200, if the community’s drainage maintenance program includes ALL of the following:
 - (a) An inspection is conducted at least once each year,
 - (b) An inspection is conducted after each storm that could adversely impact the drainage system,
 - (c) Inspections are conducted in response to citizen’s complaints, and
 - (d) Action is taken after an inspection identifies a need for maintenance or cleaning. The action taken must be in accordance with the community’s drainage maintenance procedures, which must be consistent with federal and state environmental protection laws and regulations.

Credit is dependent upon regular inspection and maintenance. The community (or other non-federal agency) must have a program to regularly inspect its drainage facilities and remove debris as needed. Neither the cost of the work nor the amount of debris removed affects the credit. A program that simply responds to complaints is not eligible for this credit.

The maintenance work recognized by the first and second items is normally done by a public works crew, usually without heavy equipment. The objective of this activity is to remove

accumulated debris that obstructs flows that cause flooding to adjacent properties. It is important that the community's procedures spell out what can and cannot be removed. In some areas with natural streams, some woody debris may remain without causing a flooding problem. In other areas, with concrete lined ditches, all debris may have to be removed to maintain the ditch's carrying capacity.

CRS credit is not provided if local drainage maintenance procedures violate federal or state laws. There may be special restrictions on streams or a requirement to obtain a federal or state permit before certain work can proceed. Often, a "general" or "statewide" permit or other permission can be granted in advance for projects that are specifically described in the permit. Such laws and regulations usually do not preclude all maintenance work, but they may place restrictions on activities that disturb natural or protected areas. These restrictions must be included in the community's procedures.

2. 50, if the community's program identifies specific "choke points" or other obstructions to flows, or sites with erosion or sedimentation problems, that are inspected and maintained differently or more frequently than other parts of the drainage system. Such inspections are in addition to those credited under item 1(b), above.
3. 50, if the community has an ongoing program, such as a capital improvements plan, to eliminate or correct drainage problems, improve drainage or storage facilities, or to construct "low maintenance" channels or other facilities. There is no credit for this item if the community does not spend money on a regular basis on such improvement projects (a one-time-only project would not be credited). There is no credit if the funded projects are not part of the drainage system that is described in the community's inspection and maintenance procedures.

The third item credited is not for an ongoing maintenance program, such as cleaning inlets and culverts. It is designed to recognize a program that makes structural or permanent changes to the channels or basins to reduce flooding or maintenance problems. Creditable examples would be ongoing programs to:

- Enlarge culvert and bridge openings to eliminate bottlenecks,
- Install permanent hard or soft bank protection measures,
- Install grates to catch debris during high flows,
- Build new retention basins to reduce flows into existing channels, or
- Convert problem channels into "low-maintenance" channels.

The capital improvements program should address the "choke points" and other obstructions to flows" that warrant the special attention that is credited in item (2). It must include

improvements to sites that are in the community's drainage system as defined in its procedures (see the documentation requirements in Section 544.a.2).

NOTE: *Once a capital improvements project is completed, it may qualify for CRS credit under Activity 530 (Flood Protection). Projects that protect repetitive loss properties receive higher credits in Activity 530.*

If an agency other than the community performs the inspection and/or debris removal, it is nonetheless the community's responsibility to document the activity for credit. In the case of a drainage district or county-wide maintenance program, the community may find it advantageous to work with other affected communities and the larger agency to develop consistent documentation that can be used by all affected communities.

Example 541.a-1. Floodville's Public Works Department inspects all of the City's channels and retention basins. City crews remove critical accumulations of debris that are found during the annual inspection and when problems are reported by neighboring residents. This work is done every winter. CDR = 200.

Over the years the crews have identified spots that are chronic problems, such as the culvert under the railroad on the unnamed ditch in the C Zone and spots on Foster Creek where ice jams usually form in late winter. The drainage maintenance procedures list these spots and require the crews to visit them first and more frequently during rains or ice breakup. The culvert under the railroad is inspected weekly and cleaned out as soon as debris is found. (CDR = 50).

Floodville does not have a formal program for funding channel improvement projects. Such work is done only if enough complaints are received and there is money left in the Public Works Department budget at the end of the fiscal year.

$$\text{CDR} = 200 + 50 + 0 = 250$$

b. Stream dumping regulations (SDR) (Maximum credit: 30 points)

SDR = EITHER:

1. 15, if regulations prohibit dumping in the community's drainage system, OR
2. 30, if regulations prohibit dumping in the community's drainage system and the community publicizes the regulatory requirements.

The ordinance or law must designate an office or official responsible for receiving complaints and monitoring compliance and it must include enforcement and abatement provisions.

An ordinance that prohibits littering or similar general nuisance is not acceptable. The regulations must specifically address the problem of keeping channels clear of materials such as brush, fill, and items normally not covered in littering ordinances. Credit is not provided for ordinance language directed solely at water quality problems, or solely for construction in floodplains. The regulation must include the entire community for CRS credit.

To receive 30 points for SDR, the community must publicize the regulatory requirement. This may be through one of four kinds of outreach projects:

1. An outreach project to the community credited under OPC in Activity 330 (Outreach Projects);
2. An outreach project pursuant to the public information strategy (OPS) credited in Activity 330, provided the public information strategy document discusses publicizing drainage system maintenance;
3. An outreach project that advises all residents and businesses in the community about the regulations, but is not credited under Activity 330; or
4. Posting “no dumping in the stream” signs at key locations in the drainage system, such as frequent problem spots, schools, and public parks. An example of a sign that has been used by several CRS communities is shown in Figure 540-1.

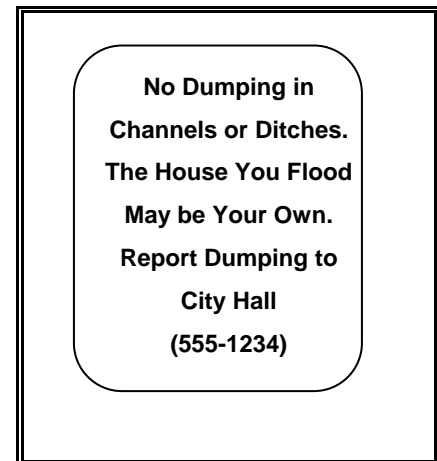


Figure 540-1.
“No dumping” sign.

Example 541.b-1. Article 21 of Floodville’s code of ordinances deals with nuisances and misdemeanors. The article states that the police department is responsible for enforcement of listed violations. It also prescribes penalties.

Section 2113 of Floodville’s code states:

It shall be unlawful to dump, deposit, or otherwise cause any trash, landscape debris, or other material to be placed in any stream, channel, ditch, pond, or basin that regularly or periodically carries or stores water.

Floodville’s documentation includes all appropriate sections of Article 21 with “SDR” marked in the margins. The City’s outreach project to the community (OPC) discusses the need for drainage system maintenance and what to do if dumping is seen (see Figure 330-1). SDR = 30

c. Coastal erosion protection maintenance (EPM)

Credit for maintaining erosion protection programs in communities with coastal erosion-prone areas is described in *CRS Credit for Management of Coastal Erosion Hazards*. The credit points, cEPM, are added to the other elements in Activity 540.

The CRS encourages communities to devote special attention to areas affected by coastal erosion. Credit is available for maintaining measures that protect buildings from coastal flooding or erosion. These include dune or mangrove preservation, bluff stabilization, and beach nourishment programs. There are several prerequisites to this credit, which are described in *CRS Credit for Management of Coastal Erosion Hazards* (see Appendix E).

542 Impact Adjustment

a. Option 1:

If all of the community's drainage system is maintained in accordance with Section 541.a, the community may use rCDR = 1.0.

b. Option 2:

If any part of the community's drainage system is maintained in accordance with Section 541.a, the community may use rCDR = 0.2.

c. Option 3:

aDC = area of the developed portion of the community.

$$rCDR = \frac{aCDR}{aDC}$$

Linear measurements can be more accurate and easier to calculate than areas, so feet or stream miles may be used for aCDR and aDC. If linear measurements are used, aDC = the total length of the streams and ditches in the developed portion of the community and aCDR = the total length of those reaches subject to the program.

To receive full credit for this activity, the community must maintain all of the surface drainage system, as defined in its procedures, not just channels in the floodplain. (See "Activity Description" at the beginning of this activity for the definition of a drainage system.) This type of program is usually implemented throughout the community and the impact adjustment ratio (rCDR) is 1.0 (Option 1).

If an element is implemented in only part of the community, the community must either use the default value, rCDR = 0.2 (Option 2), or determine the impact adjustment ratio (Option

3). In Option 3, rCDR is computed by dividing the area affected (aCDR) by the area of the developed portion of the community (aDC). The value for aDC excludes undeveloped areas where there are few buildings to protect.

This activity does not need to be conducted in undeveloped or sparsely developed areas. If a county (or other community with a large proportion of rural area) does not maintain channels in undeveloped or sparsely developed areas (e.g., areas with minimum lot sizes of 1 acre or more), or where no buildings would be affected by a lack of maintenance (e.g., on steep ravines), it may exempt those areas from the aDC calculations.

One way to identify such areas is on the Impact Adjustment Map described in Section 403. If the map has areas designated as open space or low density zoning, then the community need not implement this activity there. See Sections 402 and 403 for more information on marking the map for areas of open space and low density zoning. Other designations of undeveloped areas may be submitted by the applicant.

If the community's program does not maintain the streams, ditches, basins, etc., in all developed areas, then the impact adjustment measurements (aCDR) must exclude those areas not maintained. The two most common reasons for not maintaining a developed area are that the streams or facilities are on private property and that environmental regulations or practices prohibit removing new growth or natural debris.

Note that the CRS is not intended to encourage communities to look at flood protection in isolation from other equally important local concerns, such as habitat preservation. However, if a facility is not maintained for whatever reason and damage to buildings could result, the lack of drainage system maintenance must be reflected in the impact adjustment.

Note also that the definition of the drainage system for CRS credit is related to damage to buildings. The denominator (aDC) includes only developed areas. If an unmaintained stream is in an area where no buildings would be affected, such as a park or farmland, those areas should be excluded from both the numerator and denominator and there would be no point reduction through the impact adjustment.

543 Credit Calculation

$$\text{a. } cCDR = CDR \times rCDR$$

$$\text{b. } c540 = cCDR + SDR + cEPM$$

Example 543-1. As discussed in Section 541, the value of CDR for Floodville is 250. The program is implemented throughout the City: $rCDR = 1.0$

$$cCDR = CDR \times rCDR = 250 \times 1.0 = 250$$

The City has an ordinance that prohibits dumping in streams and ditches. The prohibition against dumping is publicized in an annual flyer (see Figure 330-1). $SDR = 30$.

$$cEPM = 0 \text{ (There is no coastal erosion in Floodville.)}$$

$$c540 = cCDR + SDR + cEPM = 250 + 30 + 0 = 280$$

During the verification visit, the ISO/CRS Specialist visits five sites on Floodville's drainage system. At one site, there is a car body with a tree at least two years old growing up through it. Therefore, the ISO/CRS Specialist visits 10 more sites. Two of the next 10 have bridge openings clogged with sediment and vegetation growing in the sediment that is more than a year old. The ISO/CRS Specialist can credit only 12 of the 15 sites sampled (80%).

Floodville's verified credit for CDR is 80% of the maximum possible credit:

$$CDR = 250 \times 0.8 = 200$$

$$c540 = 200 + 30 + 0 = 230$$

544 Credit Documentation

The community must submit the following:

- a. The procedures, instructions, or other documents that explain the community's routine inspection and debris removal program. The document(s) must:
 1. Identify who is responsible for the various aspects of the maintenance program;
 2. Describe the community's drainage system and the areas subject to the maintenance program. If the community uses impact adjustment Options 1 or 3, this description must include a map of the surface drainage system in the community's developed areas;
 3. Explain the procedures for inspection, including when regular inspections are conducted and how soon inspections are conducted after a complaint or a storm, and [if applying for credit under 541.a.2] specific problem sites that are inspected and maintained differently;

4. Explain the debris removal procedures, i.e., how soon after an inspection an area must be cleared and what can and cannot be removed; and
5. Include the records that are kept to document both the inspections and the removal projects.

The document(s) should be a description of the community's program. It should be descriptive rather than detailed and need not exceed several pages. In some cases, the description will be in several documents, such as a job description, field procedures manual, memorandum of agreement with another agency, contract for canal mowing, drainage system map, forms used for records, etc..

The description document(s) must include five items.

1. Identification of who is responsible. This may include agencies other than the community's public works department, such as a drainage district (responsible for larger canals) or the state highway department (responsible for highway bridges and culverts). The community is still responsible for providing the materials needed to verify the program.
2. A description of the community's drainage system, the areas covered by the program, and a description of the types of channels (e.g., natural or human-made). These descriptions are only needed for the developed portions of the community. If the community uses Options 1 or 3 to determine the impact adjustment, the description must include a map of all open channels and storage basins in the developed area and show which ones are subject to the maintenance program (see Section 544.e). The drainage maintenance staff must have access to the property to conduct inspections and to perform the maintenance unless the community has the legal authority to order the owners to correct the problems.
3. The procedures for inspection, including when regular inspections are conducted and how soon inspections are conducted after a complaint or a storm. If the community is applying for credit under Section 541.a.2 for identifying specific problem sites and inspecting and maintaining them differently or more frequently, then those sites and the inspection procedures also need to be included in the procedures.
4. The debris removal procedures, including how soon after an inspection an area must be cleared and what can and cannot be removed. The procedures may be different for different streams. For example, they may call for the public works department to remove downed trees and underbrush from human-made ditches but to leave them in parks or natural areas. Simply stating that "problems are corrected" or "debris is removed" is not an adequate description of what actions are to be taken for the different types of materials that may be found.
5. Records kept for the inspections and subsequent actions.

Examples of such procedures are presented in *CRS Credit for Drainage System Maintenance* (see Appendix E).

- b. [Required if the community is applying for credit under 541.a.3] Excerpts from the capital improvements program or other documentation that shows the community (or other drainage maintenance agency) has an ongoing program to reduce drainage maintenance problems. The submittal must include:
1. A master list of the community's drainage maintenance problem sites that are in need of elimination or correction. The problem sites must be part of the drainage system that the community has mapped for its CDR credit (Section 544.a.2);
 2. Recommended correction measures for the problem sites; and
 3. Documentation that funds are spent on improvement projects each year.

Usually, all the needed documentation can be found in two documents: a written capital improvements plan for public works or drainage that has a master list of proposed projects, and the community's annual budget that shows how funds are spent each year.

The master list could be of problem sites or choke points submitted in relation to the credit under 541.a.2, provided the community intends to "eliminate or correct the problem sites." In other words, the list must be related to the capital improvements program. It cannot just be a list of problems that are not slated for an improvement project.

The list can be prepared from master watershed plans, complaints, or reports from maintenance crews. Projects do not have to be prioritized or listed in any order. For example, the community may determine which projects will be funded at the beginning of each fiscal year.

Credit can only be provided if the projects are tied to the community's drainage system as defined in its drainage maintenance procedures (Section 544.a.2). Projects to improve road drainage or storm sewers can only be credited if the roadside ditches or sewers are identified in the community's procedures and regularly inspected and maintained.

If the program is administered by a county or multi-community district (i.e., an organization outside the community's jurisdiction), then the list must be prepared from master watershed plans and not solely on complaints or other ad hoc basis.

The recommended correction measures for the problem sites do not need to be the result of detailed plans or studies. They may be one sentence statements on the most likely approach (e.g., "enlarge culvert," "bank stabilization," etc.).

The documentation that funds are spent on projects each year may be in the form of a multi-year capital improvements budget or line items in several years' budgets that fund drainage improvement projects.

- c. [Required if the community is applying for credit under Section 541.b] A copy of the stream dumping ordinance or law regulating disposal of debris in the affected drainage system. The ordinance or law must designate an office or official responsible for receiving complaints and monitoring compliance and it must include enforcement and abatement provisions. The acronym SDR must be marked in the margin of the ordinance section pertaining to this element.
- d. [If the community is applying for credit under Section 541.b.2.]:
 - 1. An annual outreach project to the community credited under OPC in Activity 330 (Outreach Projects),
 - 2. An annual outreach project pursuant to the public information strategy (OPS) credited in Activity 330, provided the public information strategy document discusses publicizing drainage system maintenance,
 - 3. An annual outreach project that advises all residents and businesses in the community about the regulations, but is not credited under Activity 330, or
 - 4. Posting "no dumping in the stream" signs at key locations in the drainage system, such as frequent problem spots, schools, and public parks
- e. [If the community determines the impact adjustment ratios using Options 1 or 3 (Sections 542.a and 542.c)] An Impact Adjustment Map that shows all channels and other drainage facilities in the developed part of the community and identifies which channels and facilities are covered by the channel and basin debris removal program.

If the community does not submit a map with its application, Option 2 will be used for the impact adjustment.

The community must have the following documentation available to verify implementation of this activity:

- f. Documentation demonstrating that the inspections and needed maintenance were performed according to the procedures submitted in Section 544.a.

These records should be detailed in the CDR procedures described as the fifth item in Section 544.a. Typical documentation includes time sheets and work order forms that show follow up to inspection reports.

When the ISO/CRS Specialist makes the verification visit, a field survey may be conducted to verify that the channels and basins have been maintained in accordance with the community's procedures. See the discussion in Section 232.d.

545 For More Information

Additional information, reference materials, and examples can be found at the CRS Resource Center at <http://training.fema.gov/EMIWeb/CRS/>.

- a. The following documents are available at no cost (see Appendix E).

CRS Credit for Drainage System Maintenance

CRS Credit for Management of Coastal Erosion Hazards.

- b. Rural communities can request help on this activity from the Natural Resources Conservation Service. Requests should be submitted to the local soil and water conservation district, which is usually located in the county seat.
- c. *Stream Obstruction Removal Guidelines*, American Fisheries Society, 1983. Copies are available for \$8 plus shipping from the American Fisheries Society, 5410 Grosvenor Lane, Bethesda, MD 20814.

Public reporting burden for this application is estimated to average 31 hours per response for the application process and 4 hours for annual recertification. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and submitting the application. You are not required to respond to this collection of information unless a valid OMB control number is displayed in the upper right corner of the application. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing the burden to Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 500 C St., S.W., Washington, D.C. 20472, Paperwork Reduction Project (1660-0022). **Note: do not send your completed form to this address.**

Activity Worksheet No.	Title
AW-210	CRS Application Cover Page
AW-214	Recertification Worksheet
AW-230	Modification/Cycle Cover Page
AW-310	Elevation Certificates
AW-320	Map Information Service
AW-330	Outreach Projects
AW-340	Hazard Disclosure
AW-350	Flood Protection Information
AW-360	Flood Protection Assistance
AW-410	Additional Flood Data
AW-420	Open Space Preservation
AW-430	Higher Regulatory Standards
AW-430LD	Land Development Criteria
AW-440	Flood Data Maintenance
AW-450	Stormwater Management
AW-500	Repetitive Loss Requirements
AW-510	Floodplain Management Planning
AW-520	Acquisition and Relocation
AW-530	Flood Protection
AW-540	Drainage System Maintenance
AW-610	Flood Warning Program
AW-620	Levee Safety
AW-630	Dam Safety
AW-710	Community Growth Adjustment
AW-720	Community Credit Calculations
AW-720m	Community Credit Calculations (Modification)
AW-CB	Closed Basin Lake Hazards
AW-CE	Coastal Erosion Hazards
AW-DB	Dunes and Beaches
AW-IJ	Ice Jam Hazards
AW-MF	Mudflow Hazards
AW-SU	Land Subsidence Hazards
AW-TS	Tsunami Hazards
AW-UF	Uncertain Flow Path Hazards